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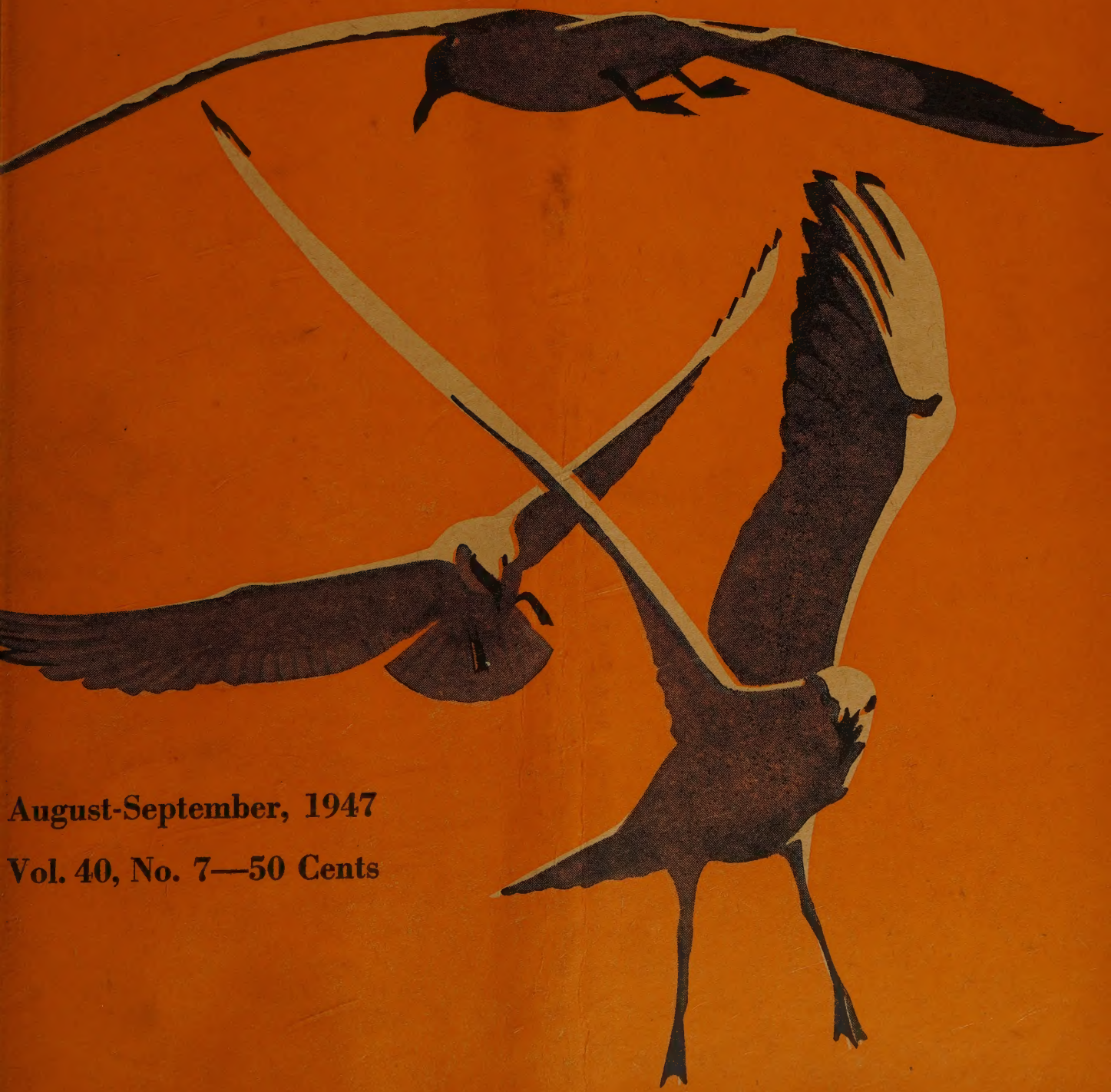

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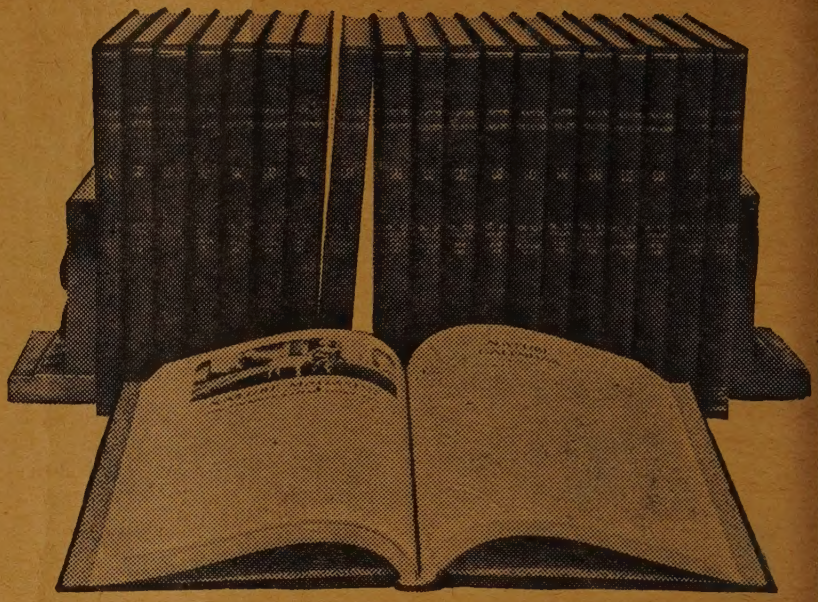

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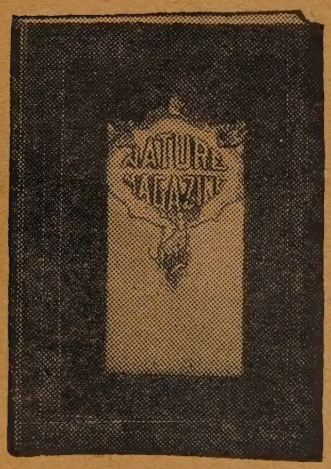

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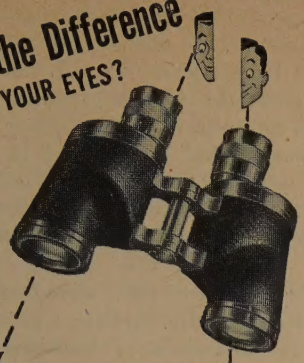

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Stories of the Outdoors

Outdoors Unlimited. Edited by J. Hammond Brown. New York. 1947. A. S. Barnes and Company. 343 pages. Illustrated. $3.50.

This is a collection of hunting, fishing and outdoor stories selected by the editors of the country's leading outdoor magazines and published under the auspices of the Outdoor Writer's Association of America. Hunting and fishing stories predominate in this selection, but other outdoor interests are represented in stories selected from the pages of *Nature Magazine* and *National Parks Magazine.* Heading illustrations have been supplied for each selection by some of the country's leading outdoor artists, and the list of authors include outstanding names in outdoor writing. Authors, editors and publishers have cooperated in making the material for this "anthology of the outdoors" available, and the O.W.A.A. will share in the revenue derived from the sale of the book. This collection is most catholic in its scope and appeal, and every lover of outdoor recreation will find something of interest in its pages. Non-hunters may not enjoy all of the stories, and inveterate gunners may not care for non-hunting stories. Perhaps, however, those of varying viewpoints will gain from seeing what interests and appeals to the other fellow. It seems to us that the selection has been largely wise, and there is much good writing and good reading in the pages of this book.

R. W. W.

Faulkner Looks Again

A Second Look. By Edward H. Faulkner. Norman, Oklahoma. 1947. The University of Oklahoma Press. 193 pages. $2.00.

In 1943, in his book *Plowman's Folly,* Edward Faulkner stirred up worldwide controversy by his attack upon the plow and his championship of soil regeneration through the incorporation of organic material at the surface. Since that first agricultural bombshell, the author has been carrying on studies far and wide, and in this sequel to the first book answers his critics and re-examines his earlier-expressed theories. He contends that the indiscriminate and continued use of commercial fertilizers is, on a second look, still folly. Soil, he says, is made up of tiny crystalline fragments, and the action of soil acids, principally those released through the decay of organic matter, unlocks the minerals required for healthy plant growth. The conclusions reached in this book—and from our own experience with our war and post-war garden we cannot differ with them—are of interest to anyone who grows things. We thought that in his first book, even though he was rowing against the current, Faulkner had a real message. We still think so.

R. W. W.

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Nature in Print

By HOWARD ZAHNISER

WHEN Dodd, Mead & Company told Dorr G. Yeager that they wanted "a friendly and informal treatment" of the western national parks and monuments, they evidently chose just the right person to meet their wishes. For *Your Western National Parks and Monuments: A Guide,* now published, is well described in that phrase. As a guidebook, Mr. Yeager explains at the outset, "it is not an exhaustive treatment, nor is it intended to be," but, as he also says, "in some respects it may be considered as a guidebook, since the areas are so arranged that one can begin at Rocky Mountain National Park and end at Mesa Verde, having completed a loop of forty western parks and monuments." The book will indeed be a contribution to any who are touring the areas it describes, and it is especially well planned and written to serve those readers who are seeking a sit-at-home enjoyment of the parks, and a satisfaction of their running curiosity regarding the superb natural features that the nation is preserving for them.

Devereux Butcher, the zealous executive secretary of the National Parks Association and thus a leader in this national preservation, has garnered from his editing of *National Parks Magazine* a somewhat different sort of volume, published by the Oxford University Press with the same exquisite and chaste beauty that has characterized Mr. Butcher's magazine. No "friendly and informal" volume for enjoyment reading cover to cover, it nevertheless makes a striking appeal to all sorts of readers. Remarkably enough, it contains 168 superb photographs reproduced in generous dimensions, and these photographs, with their captions, will surely bring to anyone a book's worth of enjoyment and a sense of having been there. And its text is not only adequate as a guide for visitors approaching these areas but also, arranged alphabetically according to the names of the areas, is of great value as a reference work, including as it does all the national parks and monuments.

Furthermore, Mr. Butcher has seen to it that this work, like all his other endeavors, is a contribution to the preservation of the areas and their defense from encroachments. Not only does he expose intrusions where they have occurred and warn against the threats to specific areas; he also writes an introductory essay, "Temples Built Not With Hands," as earnest in its "call for vigilance" as it is eloquent in its description of such features as rivulets "swollen with melted snow" that "splash over rocks as they tumble down steep slopes to form the streams that plunge deeper and deeper into the forest below." And he appends the National Parks Association's declaration of policy on "National Primeval Park Standards" prefaced with a statement of the origin of these standards.

Curiously enough, Mr. Butcher's title *Exploring Our National Parks and Monuments* is one that might better have fitted Mr. Yeager's volume. It is Mr. Yeager's pleasing style of narrative that gives the reader a sense of exploration. It is Mr. Butcher who drives home to his readers the "your-ness" of these parks and monuments, which require the informed protection on the part of the American public that he aids and urges.

It is indeed a privilege to have read two such excellent volumes that so well nourish the pride that all Americans must feel when they think about the national parks.

"Certainly we want to preserve intact forever the scenic splendors of the National Parks," says Edward H. Graham in the course of his new volume *The Land and Wildlife,* a work as broad as its title, but, like all other broad works on the American outdoors, paying its specific respects to the National Park system.

"Any change wrought by man to these areas," says Dr. Graham, "is desecration. We need also wilderness areas preserved inviolate—wilderness in the sense of undisturbed natural communities of plants and animals. There should be preserved reasonably large tracts of every important type of forest, grassland, and community that ever existed in the United States."

In the context of his immediate concerns in *The Land and Wildlife,* it is, however, for a very specific reason and a compelling one that Dr. Graham demands this preservation. Nor is the reason simply the preservation of the wildlife that is given sanctuary in all the parks. Like Devereux Butcher—who, incidentally, is as zealous for the protection of all wildlife as he is for park preservation, and gives ample evidence of his wildlife interests in his descriptions of the parks—Edward H. Graham wants all wildlife protected in the parks. But he foresees no sound wildlife conservation program resulting simply from the maintenance of sanctuaries, or sanctuaries plus hunting restrictions. Wildlife production he sees as an aspect of all land management—one that can expect only secondary consideration from human beings who are themselves compelled to live on the land, yet one that could be much increased if sound land-management practices are adopted and wildlife then given even this secondary consideration. And it is with reference to wildlife considerations in connection with the intensive management, which the body of his book outlines for all land and water areas, that Dr. Graham sees his need for national parks and wilderness areas. "We need them not for curiosity," he says, "but for the very practical reason that we should have natural points of reference for the things we do with the land. . . . Every undisturbed park, wilderness area, or other tract of land preserved in its original or pre-settlement condition is worth all it costs, as an ecological check on what is being done on adjacent or comparable areas."

This is a consideration of considerable importance in *The Land and Wildlife,* though it is somewhat incidental. "This book," says its author, "was written to make a point. The point is that the most practical wildlife management is accomplished through good land use. *The Land and Wildlife* builds its case largely on land-use practices applicable to agricultural land, although the principle applies to other lands." Without posing as a handbook outlining recommended procedures in detail, it does "describe practices, indicates how they fit into schemes of wise land use, and tells something of what they mean to wildlife." And in such a work it is all the more significant to note the emphasis on preserving wilderness areas in our forests and National Parks.

But the national parks—the western ones especially—are not only scenic wonders, natural inspirations, and invaluable study

Rock Scroll

By DANIEL SMYTHE

Creek boulders broken from some cliff
Reveal a secret hieroglyph.

Down watery pathways, as they move,
Their sides are laced with hole and groove.

A thousand years, the same old tale
Is scribbled on this tumbled shale.

Broken or tilted, frost and storm
Have cut them to their present form.

Stone envelopes wait there with light;
And still the pens of water write.

reas for scientists. They also are the cenes of many Americans' first acquaintance with the colorful history of he pioneers, and *Rocky Mountain Tales,* edited by Levette J. Davidson nd Forrester Blake, does not seem t all out of place with a group f books that deal with the national arks. Nor would its perusal be any waste f time for anyone preparing to visit the arks; it will give to some a welcome noculation against the perplexing traight-faced tales sometimes heard in he western parks, and it will contribute o the repertory of those who themselves ike to talk high, wide, and handsome bout the campfire. Imagine reading, or earing, this around a campfire:

"Opposite a certain camping ground where (Jim Bridger) frequently stopped, here ar e the bald, flat face of a mountain, but so distant that the echo from any sound which originated in camp did not return for the space of about six hours. B dger converted this circumtance into an ideal alarm clock. Upon is retiring for the night he would call out lustily, 'Time to get up!' and, true o his calculation, the alarm would roll back at the precise hour next morning when it was necessary for the camp to estir itself."

Your Western National Parks: A Guide. By Dorr G. Yeager. New York: Dodd, Mead & Co. 1947. 275 pp., with 18 photographs on 16 plates and 4 maps; foreword by Newton B. Drury, Director of the National Park Service; appendices on "Other Areas West of the Mississippi," "Hints on National Park Travel," and "Complete List of National Park Service Areas;" bibliography and index. $3.50.

Exploring Our National Parks and Monuments. By Devereux Butcher. Prepared under the auspices of the National Parks Association for Oxford University Press, N. Y. Available from the American Nature Association, Washington 6, D. C. 1947. 160 pages, with 168 photographs, map of "National Primeval Parks and other Nature Reservations," list of books and periodicals "For Further Reading," no index. $2.75 in cloth; $1.75 in Kodachrome paper edition.

The Land and Wildlife. By Edward H. Graham. New York: Oxford University Press. 1947. 232 pp., with 69 photographs on 32 plates, bibliography, and index. $4.

Rocky Mountain Tales. Edited by Levette J. Davidson and Forrester Blake. Norman, Okla.: University of Oklahoma Press. 1947. 302 pp., with 8 full-page drawings by Skelly, footnote citations to sources, and index. $3.

Tropical Fruits

Fifty Tropical Fruits of Nassau. By Kendal and Julia Morton. Coral Gables, Florida. 1946. Text House. Illustrated. $3.50.

While most of us who dwell in the North are interested in tropical fruits, our knowledge of them is usually confined to those commonly seen in the market, such as the orange, lemon, lime, banana and pomegranate. And we do not know too much about these—where they originated, how they are grown and the different types and varieties.

Now comes a most entrancing book that fills a real need for a popular work on the subject. The authors, Kendal and Julia Morton, who have lived in Nassau for a number of years, have spared no pains to make an appealing volume of *Fifty Tropical Fruits of Nassau.* Whether it is the "Akee," which opens the books, or the "Yellow Mombin," which closes it, the reader will find every chapter interesting and the 45 photographs are exceptionally good. In each photograph a rule is shown to indicate size.

The publishers are careful to point out that not only is the text correct, but that also the nomenclature, both common and scientific, has been carefully checked. The work has already been adopted as a textbook by a number of colleges and universities, and will doubtless find acceptance by horticultural and general libraries everywhere, as well as by the general public. The foreword by David Fairchild, plant explorer and authority on tropical fruits, adds a note of authenticity. A. S. W.

Century of Yosemite

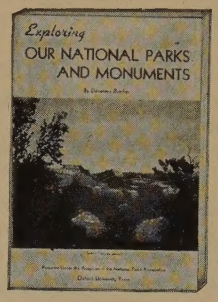
One Hundred Years in Yosemite. By Carl Parcher Russell. Berkeley, California. 1947. University of California Press. Revised edition. 226 pages. Illustrated. $3.75.

Carl Russell is Chief Naturalist of the National Park Service and was for many years Park Naturalist at Yosemite. In this book he has written, as National Park Director Newton by Drury says in a brief foreword, a book that is "more than a history of Yosemite. It traces the evolution of an idea." It was Captain Joseph Reddeford Walker who was first among white men to view Yosemite Valley from the brink of the great cliffs that embrace it. The story of exploration and of the gradually unfolding knowledge of the region is a fascinating one, interestingly reconstructed by Dr. Russell, who traces the slow progress toward the birth of the idea of preservation, and of the final fruition in the establishment of this great park. This is a book that anyone interested in National Parks, anyone who has visited Yosemite or intends to visit it, should read. An excellent chronology and an equally fine bibliography conclude the volume, which is a significant, valuable and interesting addition to park literature. We are indebted to Dr. Russell for it.

EXPLORING OUR NATIONAL PARKS AND MONUMENTS

By Devereux Butcher

A superbly illustrated, accurate and interesting book for everyone interested in our great national park system, or who plans to visit these magnificent reservations.



Size 6¾ x 9½, 160 pages, heavy paper cover printed in full color, 1 map and 170 halftone illustrations. Prepared under the auspices of the National Parks Association.

This unique book provides explicit information about how to get to these natural primeval areas, where to stay and what to see. More comprehensive than other books on the subject. It presents vividly the reasons the national parks have been established; the principals upon which they are administered; the educational and spiritual benefits to be derived from a visit to them.

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Park Birds

Birds of Zion, Bryce and Cedar Breaks. By Russell K. Grater. Zion National Park, Utah. 1947. Zion-Bryce Natural History Association. 98 pages. Illustrated. Fifty cents.

Although the areas considered in this latest bulletin of the Zion-Bryce Natural History Association are not large, they are representative of a much larger area so far as the avifauna is concerned. Thus this guide to the birds of the park regions indicated in the title, which is descriptive, is applicable to a considerable region of the Southwest. The author is a park naturalist, and he has put together a handy, popular identification bulletin that will delight all bird-loving visitors. Printing results with the seven color plates used do not prove too happy, but these do not detract from the value of the publication.

Spoonbills

The Flame Birds. By Robert Porter Allen. New York. 1947. Dodd, Mead and Co. 233 pages. Illustrated. $3.50.

One of the most striking and interesting of North American birds is the roseate spoonbill, a bird surrounded by some mystery and much fascination. In this book, in which the story is told informally, Mr. Allen deals with both the life of the bird and adventure and people encountered in his studies of the spoonbill. The result is a story that will appeal, of course, to all interested in birds, but it will also be interesting to anyone knowing nothing of birds. In fact, it might well serve to stimulate in the unknowing an interest in and appreciation of birds, and in those who study birds and fight for their conservation.

Uncle Remus Says

Walt Disney's Uncle Remus Stories. Retold by Marion Palmer from the original "Uncle Remus" stories by Joel Chandler Harris. New York. 1947. Simon and Schuster. Pictures by Al Dempster and Bill Justice, adapted from the characters and backgrounds created for the Walt Disney motion picture "Song of the South" and other Walt Disney adaptations of the original "Uncle Remus" stories.

This is one of the volumes of the "Giant Golden Book" series brought out by Simon and Schuster in the "Golden Library". Twenty-three stories comprise this book, and these are illuminated by color and black and white illustrations of the characters the public has come to know through the Disney movie productions. The stories are adapted from the Harris stories, but the dialect and essential story are preserved by the adapter. This is a lovely book, and it will, we are sure, give Uncle Remus a new vogue among young readers of today.

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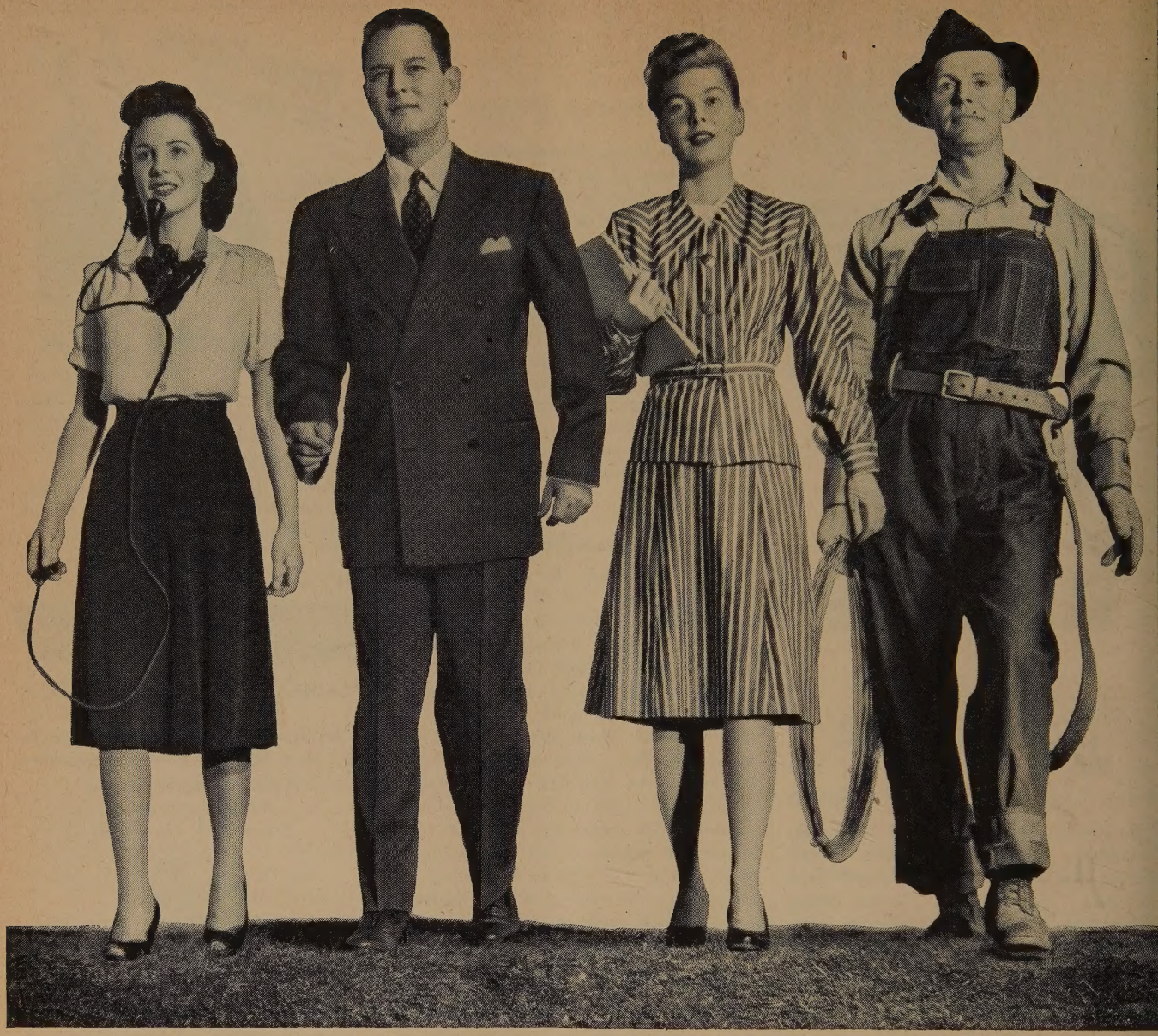

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Contents Noted

AFTER a difficult legislative battle, the Minnesota Legislature voted to place the mourning dove on the protected list, thus assuring dove protection in every State along the Canadian border. Canada already extends haven to this persecuted bird. Much credit for this goes to the Minnesota Ornithological Union, and to Guy Atherton of St. Paul, who won a particular jewel in his crown by sparkplugging the legislative fight, practically camping at the capitol when the issue was at its hottest. At about the same time that Minnesota was taking this forward step, the Wisconsin Society for Ornithology was holding ceremonies at Wisconsin's Wyalusing State Park, unveiling a monument, on which are carved a passenger pigeon and the legend: "Dedicated to the last Wisconsin passenger pigeon shot at Babcock, Sept. 1899. This species became extinct through the avarice and thoughtlessness of man."

BY ACTION of the Dominion Parliament, the week beginning April 10 each year has been designated as Wildlife Conservation Week. This is the birth date of Jack Miner, and the observance will stand as a tribute to Jack's actual and dramatic contribution to public interest in wildlife protection, particularly of geese and ducks. John R. MacNicol, member of the House of Commons, led the movement for this designation. Jack Miner was a son of Ohio, so is shared by the United States and Canada. Inasmuch as Wildlife Week in the United States is not now fixed by law, although proclaimed by the President each year, it would seem peculiarly fitting should the same week be set aside by our Congress, thus becoming Continental Wildlife Conservation Week. And Mexico may wish to join with us, for some of the birds banded by Jack Miner elude the guns of hunters in the United States to winter in Mexico.

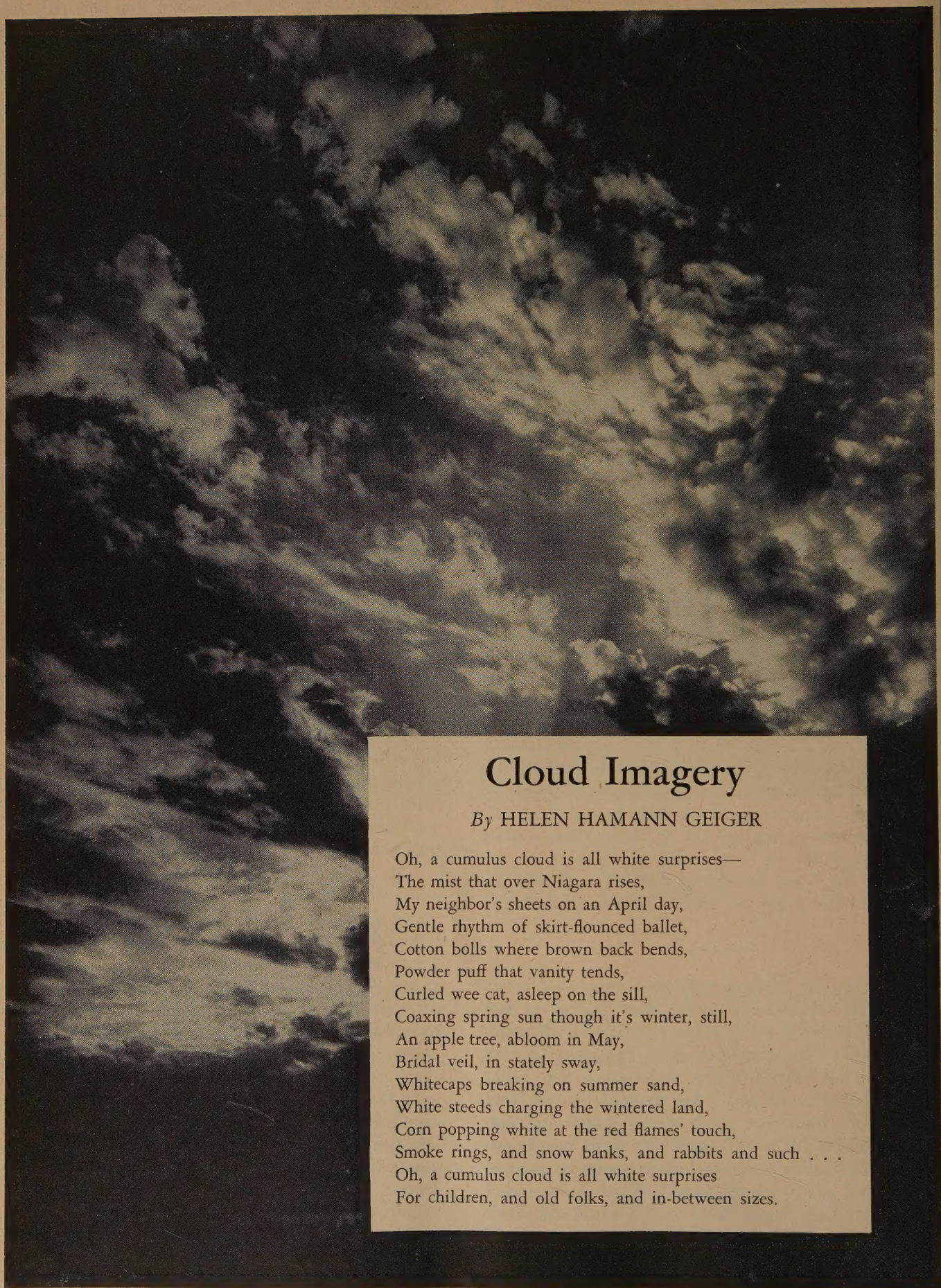
ONE OF our leading chemical companies avers, in its national advertising, that "poison ivy and its weedy cohorts are in for a bad time" if the company's weed killer is used on them. The advertisement adds: "This powerful new chemical brush killer blitzes woody brush and tough perennial weeds from fence rows, highways, rights-of-way, parks and pastures. Besides poison ivy, its deadly spray knocks out wild honeysuckle, alders, locust, mesquite, sumac and many other woody pests." While a concerted campaign of use of this floral poison would add much to the coffers of the chemical company, it could, if sufficiently general, destroy many beautiful plants and countless forms of wildlife that depend upon fence rows and other undergrowth for habitat and food. There are times when we doubt that this chemical age we are living in is all that it is cracked up to be, and the chemists could use a course in conservation study.

MASSACHUSETTS has led the way by placing on the statute books a law providing that Easter chicks or ducklings cannot be sold in quantities of less than six, or if they have been dyed or colored. This will prevent the current commercial barbarity of dooming chicks and ducklings to a few lingering days of childhandling before they die of starvation or ill-advised affection. We hope that other States will follow in the legislative path of the Bay State, and, also, that some way can be found to outlaw the sale of little lizards on tiny chains, and the idiotic and fatal enamelling of baby turtles.

IN AUTHORIZING the Board of Estimate of the City of New York to convey lands or buildings to the United Nations, the Legislature of New York also provides that "to insure the beauty of the area to be used for the United Nations' headquarters and the approaches thereto, and to promote the general welfare of the city and state of New York; to insure the safe and orderly conduct of such United Nations and to protect the useful and desirable purpose of the same, and to provide for the safety, convenience and comfort of officials, delegates, personnel and visitors to the same, such Board of Estimate shall have the power to regulate and limit signs, billboards and advertising devices, and shows, exhibits, amusements and displays . . ." Thus billboards are correctly placed with exhibitions, amusements and shows that may and should be regulated in the interest of appearance and good taste.

AFTER a long, happy and healthy life of almost fifteen and one-half years, our little black dog, Patty, has been put to sleep. We shall miss his welcome, always more effusive after half an hour than after several days. We shall miss his perky little stride, and the jangle of accumulated license tags on his collar, convenient for finding him in the dark. We shall even miss seeking the ticks lurking in his thick coat. He has left a void that we will not seek to fill by any successor, for he was an individual whose place in our hearts and memories cannot be filled. We are comforted by the fact that he suffered only briefly from a fatal pneumonia, and was spared imminent blindness and paralysis. We thank him for having given us so much, and we thank the veterinarian for saying "We can do for our pets, in their extremity, that which we cannot do for humans whom we love as much."

R. W. W.



Cloud Imagery

By HELEN HAMANN GEIGER

Oh, a cumulus cloud is all white surprises—
The mist that over Niagara rises,
My neighbor's sheets on an April day,
Gentle rhythm of skirt-flounced ballet,
Cotton bolls where brown back bends,
Powder puff that vanity tends,
Curled wee cat, asleep on the sill,
Coaxing spring sun though it's winter, still,
An apple tree, abloom in May,
Bridal veil, in stately sway,
Whitecaps breaking on summer sand,
White steeds charging the wintered land,
Corn popping white at the red flames' touch,
Smoke rings, and snow banks, and rabbits and such . . .
Oh, a cumulus cloud is all white surprises
For children, and old folks, and in-between sizes.

"Old Sal"

By HAZEL WILTON

Illustrated by Clarence Tillenius

"The snake reared its head about eighteen inches and swung it with my motion, continuing to shake its rattles."

OLD SAL was a wild sow whose acquaintance we made while living in a primitive section of northwest Florida. Our first experience with her convinced us that she was a direct descendant of the swine into which Christ cast the evil spirits. Her trail of destruction made Sherman's march to the sea seem a mild affair, and started a feud that goaded us to the point of mayhem. But before the summer was over she had won our affection, respect and undying gratitude. And now that she is gone we mourn her loss.

Two days after we moved into the cottage by the bay "Sal" came in the night, rooted up all the young plants we had painstakingly set out, turned over the bird bath, knocked down the bird perch, excavated the garbage, upset the emergency pump table, spilling buckets and tubs with a deafening clatter, ploughed through the freshly planted vegetable garden like a bulldozer, chewed up a new whisk broom, and exhumed a dead snake.

From then on for almost a month it seemed that our lives were largely taken up with trying to forestall and outwit the marauder. "Whoever cooked up the idea that pigs are lazy," thought I, "reckoned without Old Sal!" Her industry and resourcefulness were amazing.

We didn't know her as "Old Sal" at first. She was inadvertently named later by a neighbor child, who mistook my pronunciation of "old sow" for "Old Sal." But, after all, this was as good a name as any.

At first she had confined her operations at our place to the night shift. But one day I came home with a beautiful bunch of white seedless grapes for the mockingbirds, who were busy feeding and educating a trio of fledglings. After I had put the grapes on the perch and returned to the house, Old Sal suddenly appeared from ambush. I saw her coming and rushed to retrieve the grapes. But she saw me, too, did a little rushing of her own and got there first.

The grapes were just to her taste. She threw her head back and gobbled them all with the smacking appreciation of a gourmet, then sauntered off as though quite pleased with herself for getting ahead of me.

This was too much. I ran back to the house, grabbed the first weapon available, which happened to be a stray golf stick, and started after her, yelling undignified threats. She paid about as much attention to me as if I had been a screech owl, and, when safely in the brush, turned and expressed her opinion of me with a contemptuous grunt.

I returned to the house feeling frustrated, and a little ashamed of myself for getting so angry with her.

"She's only doing what you and I would do if we had to," said Mother. "She's just hungry and is making her living the best way she knows how."

Until then we had assumed that the sow had a home to which she could turn for food and shelter, and that her visits to our place were the result of pure

"... about this time Jenny, the bantam, enlisted with Old Sal and her troop."

wantonness and greed. But now it began to appear that she was entirely on her own. We discovered that she slept under a vacant house across the way, and ranged over a territory the confines of which harbored no one who claimed or would admit ownership of her.

Where Sal found enough food to keep her alive was a mystery, but she showed no signs of malnutrition. In fact, she seemed in excellent condition. Also it became increasingly evident that she was an expectant mother. This aroused our sympathy, and we began to put things out for her at night, fearing to encourage her with open offerings. She always cleaned up these gifts to the last crumb, and, no doubt, was quite surprised at our change of policy.

When the sow failed to show up for several days we became apprehensive, fearing some ill fate had befallen her. This fear was soon dispelled, however. Late one afternoon, as the western sky deepened to crimson and the bay lay still and breathless with dark moving shadows where schools of mullet traveled east, Old Sal strolled nonchalantly in from the woods trailed by a bouquet of six tiny pigs.

A "bouquet of pigs" may sound fantastic, but that is just what they were—clean and fresh and beautiful. One was red, one Swedish blonde, one black and white with pink ears, nose and feet, one amber, one almost entirely white, with a few black spots, and one the color of tupelo honey.

We watched the captivating parade with fascination. Old Sal stalked sedately ahead of them, as though completely indifferent to our exclamations of appreciation and delight. Yet there was a kind of pride in her walk, and we flattered ourselves that she had brought her banner production especially for our inspection.

I hurried for a loaf of bread and some bananas as gifts of congratulation. But Sal had not forgotten the golf stick episode, and when I took the food out to her she misunderstood and thought I was chasing her. I managed, however, to toss a slice of bread into the path ahead of her, and when she came to it she ate it and turned to regard me with a question in her eyes. I tossed another slice and this persuaded her my attitude was friendly. She came toward me then and accepted the remainder of the loaf and the bananas.

The food was intended for her only, because I knew she needed a lot of nourishment to supply milk for such a large and representative family. But she allowed all six little pigs to share it with her. When one appeared to be getting more than its share, or was after some morsel she fancied herself, she bounced him off with her nose, eliciting startled squeaks of protest from the offending one.

Later she took them down to the water for a bath, and they were a charming sight trailing up the beach in the soft glow of sunset. There was always the cleanness of woods and streams, of sun and wind about Old Sal. She never exuded the slightest odor or stench that is part of the misfortune of captive animals.

I was almost afraid now of what I had done. I was afraid she might take it as an invitation to come and live with us. But I need not have worried. She subsequently acted with more tact and understanding than most human animals would have shown under similar circumstances. She seemed anxious to prove

to me that she did not intend to abuse my hospitality by wearing out her welcome.

She was a strange hog in numerous ways, and upset many of our preconceived notions about her species. For one thing, I had always been given to understand that hogs would eat almost anything, short of shoe leather and cast iron. Old Sal would not. She was fastidious. Once we gave her some milk that was older than we cared to use, but not spoiled. She would not touch it. Another time we gave her a pound of shelled green peanuts, some of which had gathered a light feather of mold. She examined them and turned away in disgust. And she would not eat turnips, raw or cooked. Likewise she seemed not to care for coconut hulls, grapefruit peelings, paper sacks or tin cans. But she was crazy about brandied peaches. A two-quart jar of them accidentally provided her lunch one day, and she haunted the spot for weeks after, nosing hopefully.

Returned from a morning of shopping, I had left the brandied fruit with other packages on the back stoop, and had gone to the garage to lock up. When I came back the jar lay cracked wide open on the cement walk, and Old Sal, having appeared from nowhere in particular, was at work on the peaches, bouncing pigs off right and left.

When finished she staggered away with her fancy cargo, at an angle of several degrees, with a strong list to leeward. Seeming to realize she was slightly off keel, she stopped and considered her course, then figuratively squared her shoulders, turned, and came back patently hoping for more "hair of the dog". Disappointed, she weaved over and looked hard at the pump table, as though pondering the idea of a tour of pillage. But this was old stuff now, and apparently seemed to Sal unworthy of the occasion, for she finally shoved off in another direction, rolling a little, but with all sails unfurled.

"That Sal's a character," observed old man Wickett, watching her. Old man Wickett, an early settler of the vicinity, came frequently to help us out with odd jobs, and became as interested in the wild sow as were we.

Strangely, claimants appeared from all sides now. Neighbors who had "sicked" their dogs on her before, now suddenly laid claim to her. The pigs, no doubt, appeared to the would-be guardians as animated dollar marks running around on all fours, increasing in value like compound interest. Numerous "promises" and threats of penning up the mother and her litter filtered through to us and we feared for the old sow's safety, for she was a denizen of the wild and loved her liberty.

But either she was too much for efforts at catching her, or the expense and responsibility of feeding, necessarily involved in penning her, proved unappealing, for she continued to roam at will with her varicolored children.

Although she did not speak English the sow had a language of her own, and had no trouble making herself understood. She knew how to ask for water by going direct to the pump and grunting. She also knew how to request an extra helping of food when the daily pickings in the woods had been slim. She did this with a pleading look from under lashes as long and thick as a movie star's.

When she wanted the pigs to nurse she threw her nose in the air, twitched her nostrils, and sent out a special call that brought the sextet running, as excited as any other group of children invited to dinner. When weary of their tugging, she would lie flat on her belly. This ruthless handling of the situ-

". . . the mockingbirds were busy feeding and educating a trio of fledglings."

ation brought forth outraged squeals of objection from the sucklings, who immediately formed themselves into a revolving wheel of indignant pickets. Sometimes she would sneak off and hide from them for an interlude of rest, and their frantic searching was both comical and pathetic.

Before, when humans or dogs chased her, she considered retreat the better part of valor, but now she turned on the enemy in defense of her young ones. This courage, although admirable, I am afraid was her undoing, for one day she came limping in from the woods with a badly mangled foot. It was swollen and so painful she could hardly touch it to the ground, often falling to her knee rather than bear her weight on the hoof.

Even in this incapacitated state she did not push herself and take undue advantage. We fed her more often now, because she was a creature in trouble and needed help. But after each feeding she laboriously dragged herself off into the woods again, as though not wanting to impose. And she continued to take excellent care of her family. Each day she managed to get down to the beach and bathe her foot in the salt water. This seemed to help, for she slowly improved, although she never entirely recovered.

It was about this time that Jenny, the bantam, enlisted with Old Sal and her troop. The little hen followed them about faithfully, running to share what treasures they found. They accepted her amiably, never molesting her. At night she accompanied them "home" and roosted on Old Sal's back.

Then came the day that will remain etched in my memory as long as I live. I was on my way for a sun bath at our solarium in the clearing at the edge of the woods. Suddenly I stopped short at sight of a big, long, crooked stick lying directly across my path about six feet away. The stick had not been there before and I was startled and puzzled, wondering what intruder might have left it there. I started forward to investigate, and the stick moved. Then I saw, to my horror, a diamondbacked rattler.

My blood congealed and I froze into immobility, like any other animal before a mortal enemy. The snake stopped too, and lifted his head inquiringly. Through some obscure instinct I stood as still as death. The snake lowered his head and started to move on toward the woods. Then from my nerveless fingers a small clock I had taken along for timing my exposure to the sun, fell to the ground with a thud and a tinkle. The snake coiled instantly, with rattles standing erect on a level with his head. I stood motionless, now from sheer terror. I had no weapon; no gun, no stick. Even my vocal chords failed to respond and a scream lay stillborn in my throat. "This is it", I thought. "Now I shall never see the glory or misery of the atomic age. I shall die. And I don't want to die."

A movement in the brush, at a slight distance beyond and to the right, pushed its way into my consciousness, and I remember wondering vaguely what it might be. Then came the deadly sound that has struck terror to the soul of almost every living thing that has ever heard it. It has been described as a "whir", a "jar", a "buzz", and a "crackle". To me it was like an eerie rustle of dry leaves.

I took one slow step backward now, almost without volition, as though pulled by some force other than my own. The snake reared its head about eighteen inches and swung it with my motion, continuing to shake its rattles. Another movement took place in the brush, nearer now. And then a miracle happened.

From behind a palmetto stepped Old Sal. In a flash she grabbed that snake in her powerful jaws a few inches below its head, and there before my astounded eyes the rattler squirmed, and writhed, and twisted, and then lay still.

My nerves relaxed. I came out of my temporary paralysis like a person coming from under the ether of a major operation, surprised and grateful just to be alive.

"Old Sal", said I, "I salute you. And for that you shall have a whole dozen bananas, some red apples, a bunch of grapes and some brandied peaches." My champion grunted skeptically, but followed me to the house. Evidently she was on one of her periodic sneaks, for there was not a pig in sight.

"Yes", said old man Wickett when I told him of the incident, "a hog is death to rattlesnakes. I always say if you have any pigs around leave 'em be, they'll near about rid a place of snakes."

Not long after that Little Jenny and the pigs came one day without Old Sal. We thought at first the old sow was staging another one of her "sneaks" from the pigs. But the second day she failed to come with them we began to worry. And the third day, fearing she might be lying wounded and helpless somewhere in the woods, we set out with the pigs as a vanguard escort and combed the entire territory over which she ranged. But we could find no trace of her. None of the neighbors could or would give any information about what had happened to her.

"I believe that fella up on the highway, who pens his own dog up like a prisoner, shot Old Sal and buried her", volunteered old man Wickett.

"What makes you think so?"

"He's a mealy mouthed hypocrite, and a coward feels mighty important with a gun in his hands."

It is winter now, and Little Jenny and the pigs, almost half grown, still come at intervals and are welcome. But we miss Old Sal.

When the bay is stained with color from an evening sky, and spicy scents sift in from the winter woods, I remember how the old sow used to stand on the bluff looking out over the water, then lift her snout to the wind and wander off alone into the approaching night, and I feel a sense of loss and a twinge of sadness at the passing of a real friend.

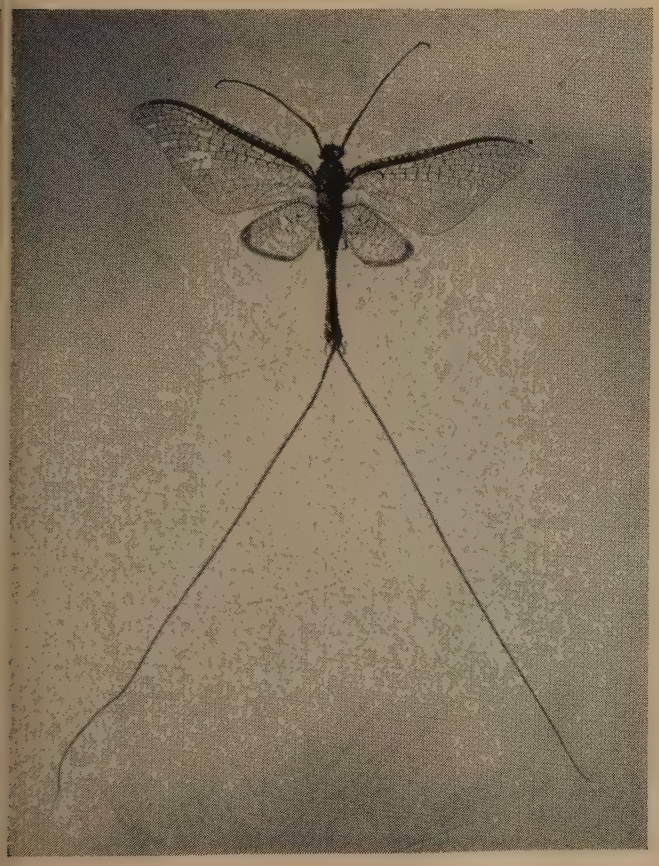
A land snail, creeping about, finds food in the foliage and drink in the dewdrops. Enemies and dry air keep the snails inactive during the day, but at night, or immediately after showers, they come out in surprising numbers.

In the Beechwoods

By LORUS J. and MARGERY J. MILNE

Photographs by the Authors

SAUNTERING slowly, week after week, through the same woods, beside the same streams, on the same trails, can supply a great deal of pleasure. In spite of frequent repetition, there is always a difference to delight us when we return to the place we were last year, or just this morning. Whether it is a beach or a pond, a sand dune or a woodlot, we see unpredictable changes in the animal inhabitants. On each trip we learn a little more of the complexities that link the lives of creatures there.



Every spring we experience a new thrill when we recognize the green finger that will open out into a new milkweed, or the fuzzy curl that will unfold as leaves of sassafras. We find newly hatched bagworms jerking their tiny shelters along below fresh foliage. Each fall we notice details of preparations for winter that had escaped us in previous years. Such pleasures are not to be had at the price of a single trip. They come only from observing, remembering and returning, time and again, to the same or similar spots. They are a type of learning not to be gained from textbook or lecture hall. Only the person who has walked and seen, or sat and watched, can come really to know a living creature in its natural state.

There is much to be said for sitting down and waiting for something to happen. But one must be patient; delay is usual. Fear-filled memory of recent movements is still in animal minds. Generally it prevents the prompt appearance of anything strange, queer or comical. The birds are well aware that an

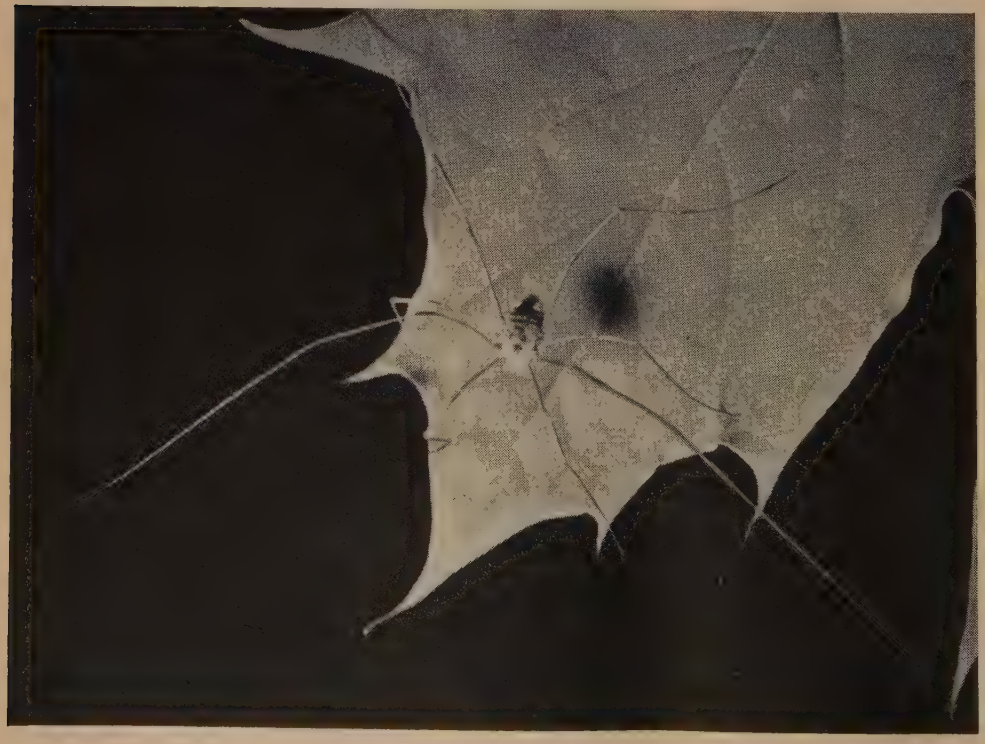
The adult mayfly lives only long enough to find a mate and lay eggs—an aerial existence seldom longer than twenty-four hours. The first part of the winged existence is spent in a slightly opaque skin that covers the whole body, but is shed when the pre-adult becomes ready for the final phase of its life. Mouthparts are reduced to vestiges and are not used. Food stored by the aquatic early stages suffices for the short life in air.

unfamiliar object is in their midst; so are the tree frogs, the crickets and the katydids. Yet if the observer keeps still, the animals forget the newness and take up their lives where they left off. And the naturalist sees more and more around him the longer he remains in one place. Patience and practice are both essential. Reading the experiences of others helps sharpen the eye and interpret what is seen. With increasing skill many of the great number of creatures within reach become apparent, even before they relax and move again.

Recently we sat down on a moss-encrusted bank near a tiny stream that runs through a beechwood a few blocks from our house. At first we simply enjoyed the sparkle of summer sunshine on a riffle half an inch deep, and the antics of a little fish that was working its way upstream, darting from the eddy behind one rock to the shelter of another. Soon the dampness in the moss penetrated our clothing and made itself noticeable. But by that time we had found a whole population of animals on a bush beside us. Spread in the shallow V between two nearby leaves, a harvest spider rested quietly, her slender legs outstretched and her body in contact with the plant. We thought she was asleep, but every time the wind blew she raised her second pair of legs—the longest ones—in a nervous gesture. She held them aloft as though seeking something. Then, as the breeze died away, the spider rested them again. Perhaps her sense of smell is located on those legs.

To the under side of another leaf on that shrub hung an insect ghost—the winged skin of a mayfly. It brought to mind the many times we have watched this flying pre-adult settle on a plant and proceed to burst the skin along its back, so that one more layer can be peeled away. The mature insect then spreads

A bagworm with a portable shelter made from locust leaves and stalks sewn together with silk. The caterpillar has a special pair of hooked feet at its hinder end with which to cling to the "bag." Often the insect anchors its home near fresh foliage and feeds by reaching out in various directions—withdrawing to its trailer house whenever danger threatens.



A harvestman with sensitive legs outstretched. These "daddy-long-legs" are completely harmless, depending on unpleasant taste and smell to safeguard their lives. On the back is a dome-like turret with the eyes.

Katydids are large long-horned grasshoppers and are usually green. They rub the bases of their wings together to produce the familiar sounds, and other katydids (including future mates) listen to the calls with tiny ears set in the fore-legs just below the "knee." These insects pay very little attention to a light at night, but they are very timid and stop their calls as soon as a heavy footfall or rattling of nearby bushes disturbs them.

its glassy wings and three bristle-like tails to dry, before flitting off to join its mates on this, its last day of life. The mayfly is unique in such behavior; no other kind of insect moults again after reaching the winged condition. And the milky to lemon-yellow wings of the pre-adult show the extra thickness that will be left clinging to a leaf, like the one before us.

Suddenly in the air a few inches in front of our faces, a bee-like insect hovered motionless on wings that beat so rapidly that they made scarcely more than a gray haze. The creature turned abruptly from time to time as it hung there in space, controlled as precisely as any hummingbird. It even backed up a little like a helicopter, but so slow was this motion that we could see its legs folded against its underparts. Then, just as suddenly as it had appeared, it vanished in a blur of speed, to settle, light as a feather, on a hand. Touch told of its new position long before vision followed to its resting place. It clung firmly, its golden brown body pulsing with exaggerated breathing movements. But already we knew it to be a fly that is a fake—the "drone fly" that fooled Samson in what our Bible says was B.C. 1161! It is the adult of the "rat-tailed maggot" that lives in puddles of liquid over the decaying matter and extends its telescoping tail to the surface to get air to breathe. These were the flies on Samson's dead lion, and the larvae that Edwin Way Teale found in his tree hole. The insect looks like a bee, and, when caught, buzzes like an angry worker. But the fly makes no honey and has no sting; it is completely harmless. We often catch them for surprised friends, to demonstrate that there are bluffers in the insect world too. If Samson had boasted less and observed more closely he would have had far more startling news to tell—of a fly that mimics the honeymaker so well that those who respect a bee's sting leave the false "bee" alone, too.

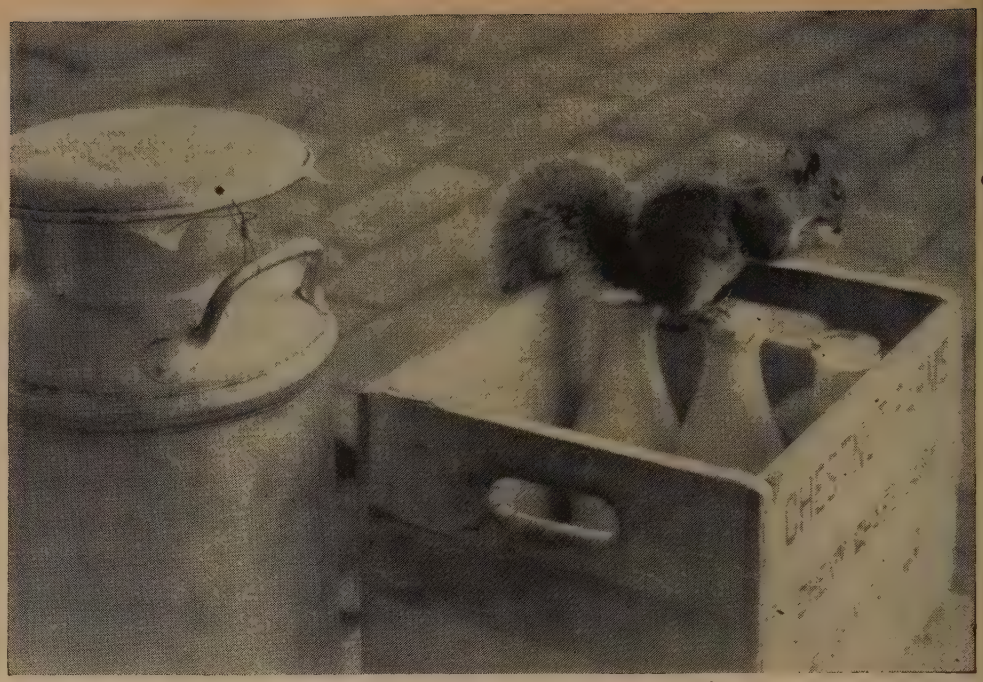
Over the quiet water above the riffle before us, a score of dark-winged caddisflies cavorted like a corps of black-cloaked ballet dancers, swirling and fluttering just above the surface. One well-guided swoop with a butterfly net could have caught them all, so closely in formation was their flight. We have collected the dark caddis time and again, and found that they are fertile females. This dance is part of their egg-laying routine. As we watched them whirl and glide we could recognize the occasional dive to the water surface, as a mother dipped her body tip and washed off an extruded egg. The caddisflies rose and fell, with only scattered dimples in the surface twinkling for an instant to mark the place where tiny eggs were sinking to the bottom.

To an alder leaf overhanging the water clung a large land snail, its pebbled foot withdrawn into the flat spiral of the shell. We gave it a gentle tug. Down it tumbled into an outstretched hand, leaving on the leaf a small sheet of glistening mucus marking its sleeping place. Slowly the body issued from the shell, and gradually two slender eyestalks extended from the head. We set the creature on its leaf, and in a few minutes it spread its flat sole again and pulled back into its shelter to continue its nap.

Sometimes we take flashlights and return to these beechwoods after dark. The ants are still scouting leaves and forest litter, trails and tree trunks. The drone fly is sleeping on a leaf. If we are so unkind as to touch it, the insect (Continued on page 386)

Oscar Takes to Drink

By ERIC MAY



Oscar is caught in the act, and the camera provides evidence of the gray squirrel's freebooting tendencies.

PHOTOGRAPH BY BROTHER CLAUDE MATTINGLY

OSCAR is a squirrel. More than that, he is a problem. We had only known of his existence for a week or so before we came to realize that a little untamed ball of fur with a bushy tail can quite upset the routine of a friary. Oscar inhabits a tree on our friary grounds, but that does not make him a devout little creature. For Oscar has a vice. He steals.

Each morning, rather early, monastic silence is shattered by the roar of a truck delivering milk to the kitchen door of the friary. The milk is left outside the door, most of it in a huge can, some of it in regular quart bottles. There it remains until Brother Cook can bring it in for breakfast.

One morning Brother Cook opened the kitchen door as usual to bring in the milk. Everything was fine except for one thing. Three of the milk bottle covers and caps had been removed, and each quart had been lowered about one inch. The next day, the same thing happened. Puzzled, Brother Cook decided to find out what was going on. The following day up roared the truck as usual. The milk was placed near the door and a pall of silence marked the truck's departure. This was when Brother Cook, hidden behind the kitchen door, first made the acquaintance of Oscar.

The squirrel appeared out of nowhere. With a hop, and a skip, and a flirt of his tail, Oscar was perched on top of the milk bottles. What happened next left Brother Cook gaping. Quick as a flash Oscar sank his teeth into the protective cover of the first milk bottle, ripped it off, discarded it, whisked the cap off the bottle, pausing only to lick away the cream adhering to it, and then proceeded to lap up the milk till he reached his depth—about one inch from the top. Then he was at the next bottle. The same swift procedure followed. Off came the cover and the cap. But Oscar, his center of gravity probably disturbed by the addition of the cream, toppled bottle number two, sending its contents all over the case. Did Oscar stop to lick up the milk now so handy for him? He did not. He preferred the cream at the top of the third bottle. He was in the act of procuring it when Brother Cook, instinctively moving to the rescue of his milk supply, sent the furry little animal scampering ten feet away. There Oscar sat on his haunches, forefeet joined in an attitude of supplication, with an innocent look on his face that said, "Oo—look what someone has done!"

During the day Brother Cook duly informed the friars of Oscar and his antics. He did not meet much credence. "A squirrel drink milk?" he was asked. "Never heard of such a thing. Nuts, yes. Milk, no." And so it continued, until Brother Cook invited them to see for themselves.

Next day the ruler of the culinary department loaded a camera. He placed it near the scene of villany. Right in front of the shutter stood the bait—three bottles of milk. With Brother Cook hidden behind the door and a long line of friars, heads thrust expectantly from second story windows, the vigil was begun. Sure enough, Oscar soon put in his appearance. However, acutely conscious of the row of heads above him, the squirrel frolicked innocently in the vicinity of his previous crimes, one eye kept on the milk, the other on the friars above him. The latter, finally summoned elsewhere by duty, had to leave their post of observation. Not so Brother Cook. With fingers tensed on the shutter release, he watched Oscar struggle a bit with temptation, and then fall.

Oscar (as Brother Cook calls him) still romps around the friary, and hopes are high that he can eventually be tamed. Although the friars now deny him their daily milk supply, they do supply him with squirrely food—nuts. Oscar seems satisfied.

Pesky, the Raven

By RICHARD GERSTELL

Illustrated by Jackson Miles Abbot

Any bright object, such as a spoon, delighted Pesky, who would carry it away and hide it in most careful fashion.

PESKY was a black and shiny raven whose life was full of ups and downs. Although he was well along in years, he seldom failed to give childlike vent to his emotions. He displayed them not only by his actions but by plainly spoken words.

This moody bird—in truth only a gargantuan crow—attained his power of speech by no cruel splitting of his tongue. Instead, he incidentally picked up his vocabulary in the course of constant contact with the humans who had been his friends since he was but a few weeks old.

Pesky's parental home was a large, grass-lined nest of interwoven sticks lodged in a crevice beneath an overhanging rock high on the face of a rugged mountain cliff, and commanding a sweeping view of vast, unbroken forest. There, for more than thirty years, a pair of ravens—which are believed to mate for life—had reared a brood each season.

The spring of Pesky's birth, the aerie held a typical clutch of five eggs of deep blue-green. All were splotched with dark brown flecks of varied shapes. Roughly the size of those of a common bantam chicken, all differed slightly in dimensions, while one was noticeably smaller than the rest. The last was laid in early March, and incubation was begun.

Devotedly the mother raven sat on her eggs for twenty days and twenty nights. At intervals, she briefly left the nest to snatch some scant supply of food. During the course of these forays, the male obligingly assumed her patient duty. Soon after April first, the young burst from their restraining shells.

At first, the tiny, grayish-white and downy young lay all but helpless in the nest, able only to raise their heads for nourishment. In the woodlands the old birds avidly stuffed their maws with foods of wide variety—carrion, insects, reptiles, fish, eggs and countless vegetable items, from toadstools up and down. Supplied, the parents flew bee-line to the nest, croaking softly as they approached the ledge. On this signal the youngsters opened wide their mouths, each with its brilliant, scarlet lining. Into these gaping targets the adults thrust their huge beaks deep down the fledglings' gullets, regurgitating into their empty stomachs the freshly eaten foods. From dawn to dusk, both parents continually traveled to and from the cliff, vainly trying to keep abreast of the nestlings' voracious appetites.

After little more than a week of this continual feeding, the young sat erect and softly answered each croak of their approaching parents. Rows of blue-gray pin quills had by then appeared on their wings and downy bodies. A fortnight later, they stood and flapped their all but fully feathered wings, cawing loudly. Just before the group was ready for the first venture from the nest, human hands took Pesky from the aerie.

The history of the bird is uncertain from that time until some twelve months later. Then he reached his final home, a publicly supported aviary. It is known that he passed illegally—by law his kind is now granted full protection in some eastern states—through several hands, but the details of his life are lacking.

In his new surroundings, the effervescent personality of the full-grown raven promptly won him universal liking. But this feeling of goodwill was not reciprocal. From the very start, Pesky showed strong likes and dislikes for his many human visitors; why, man cannot know.

One ornithologist, in particular, delighted in the

In the North ravens find great joy in pestering sled dogs, dropping sticks and stones on them to awaken them and then zooming close to the dogs' heads but safely out of reach.

antics by which the bird showed displeasure at his presence. He stood by the cage one day laughing at the raven's angry screams and fluttering. When Pesky finally retreated to sulk in a far corner, the man leaned an elbow on the cage and fell into idle conversation. Suddenly, without the slightest warning, the black one streaked across the pen and laid a telling blow with his sharp beak directly on the visitor's funny bone. Surprised and partially doubled-over by the tingling pains that shot up his arm and down his spine, the bird man unwittingly moved even closer to the cage. Pesky promptly seized this unexpected opportunity to get in a second wallop, expertly aimed to hit a protruding ankle bone. The man jumped back and shouted, "That bird's no friend of mine."

The raven also possessed a strong dislike for all dogs. Crouching menacingly on the floor, Pesky fairly bristled whenever a dog approached his cage. With his shoulder hackles plainly showing, and his short, feathered ear tufts fully raised, the raven fiercely struck at every tender canine snout unwisely placed against the wire. This feeling is apparently common to all members of his tribe.

In the Far North, where ravens regularly visit sites of human habitation, they sometimes spend hours tormenting sled dogs. Their favorite prank—one obviously requiring forethought—is directed at animals lying on the ground. Carrying sticks or stones in foot or beak, they silently fly close above the ground and drop things on the sleeping targets. When the rudely startled dogs jump to their feet, the birds swoop down above their heads, just out of reach, uttering loud croaks of glee.

Pesky, however, displayed only gentle kindness toward his friends. He would sit calmly upon his keeper's wrist or shoulder, showing not the slightest inclination to strike with his sharp beak. In fact, he would often let his master run a finger full length down his cavernous gullet, offering absolutely no resistance. Then, too, he would accept food proferred in the finger tips with the most gracious manners imaginable.

Pesky displayed his powers of speech to only a favored few. As a rule, he never began a conversation when anyone was in sight. But if all was relatively quiet and his master was close by, he would start by uttering several soft and gutteral coos. A few seconds of silence invariably followed. Then he would plainly call, "Oooo-o—o, Dick." After this he would watch and listen. If his keeper did not soon appear, the cry was repeated with increased volume. At the sight of his approaching friend, the bird would quiver with obvious pleasure, change his tone and say cheerily, "Hello, Dick. Hello, Dick." These were his only human words, but he would then sit and mimic perfectly each bird-like sound the human uttered, with the exception of a whistle. In response to this, he would merely cock his head inquisitively to one side.

Like pack rats, jays, and certain other creatures of the wild, Pesky was fascinated by any small, bright object within his sight. At large within the building that housed his cage, he would pick up spoons, nails and all other shiny items lying about loose. One by one he would take them in his beak and fly around in search of some nook or cranny in which to hide them. Some of these still remain cleverly secreted where they will doubtless prove a puzzle to those who eventually tear the building down. In his pen, a small tin plate, a golf ball and such served as toys.

In one respect, the raven set a perfect example for

all children—he never left his playthings on the floor. Instead, he would always stow them high on some ledge or corner in his pen. Even feathers, bones and other clean but inedible portions of his food were carefully tucked away, often completely out of sight. The surest way to make Pesky mad was to knock one of these objects to the floor. Screaming loudly, he would jump down, pick it up and place it elsewhere off the boards.

Pesky was decidedly a show-off. His favorite act was dubbed "the marble trick." Given five small agates—the type mibsters use for "shooters"—he would gulp them down like grains of corn. Then, sitting on his perch, he would quickly toss his head and one would reappear between his bill tips. Another toss and a second lodged behind the first. These motions were repeated—each time too fast to be followed with the human eye—until all five were lined up in his beak. Then he would drop them on the floor and, like as not, repeat the trick.

At other times the bird performed at local meetings where his master went to lecture. At the outset, he would perch quietly upon the back of a chair placed on the speaker's platform. When the audience was finally settled—and doubtless when he thought the talk was dragging—Pesky would take off and circle over the heads of the admiring throng. But he would soon return and take up station on his chair. There he would sit proudly, with feathered beard protruding, until the program was concluded.

Wild ravens are possessed of unusual powers of flight. Unlike crows and jays, their smaller cousins, they do not continuously beat their wings aloft; at intervals they spread them wide and soar, although not as well as gull or hawk. Particularly when the winds are high, they spend hours playing in the air. In small, loud-croaking flocks, they tumble, zoom with half-closed wings, and even loop the loop. Military personnel stationed in the bleak Aleutian Islands swear the ravens learned the latter from watching aircraft maneuvering, but ornithologists scoff at this.

In Pesky's sheltered life, his powerful, three-inch beak proved most useful. With it he tore red meat from the bone, cracked the hard shells of English walnuts and even snipped the buttons from the jackets of unsuspecting visitors. Having seen such feats as these, one is inclined to believe that there may be some truth to early colonial reports of ravens launching fatal attacks on newborn lambs and ailing sheep by pecking out their eyes.

In his eighth year, Pesky suddenly died from undetermined causes. Since individual ravens are believed to live sometimes as long as man, his life may have been comparatively short. But in his brief span he did much to dispel the undesirable reputation his race has carried through the centuries. The scores of people who saw him came to realize that the raven is no dour, mysterious omen of evil, but a resourceful, stout-hearted, mischievous and entertaining creature. Although their feeding habits may render large numbers of the birds undesirable in certain areas, the species is yet a distinct asset among our fauna.

Dead in Its Tracks

By GEORGE A. SMITH

FROM a casual glance at the bluebottle fly shown in the illustration it appears to be hale and hearty, and only resting momentarily on a blade of grass. This fly is dead in its tracks from a fungus.

No living thing seems to be entirely immune from disease. Even a common fly is no exception. Its worry is caused by a spore that the fly readily picks up as it nibbles at almost any kind of food it happens to find in its travels. Once a spore is inside the digestive system of the fly its doom is soon sealed. Fungus from the spore grows so rapidly inside the fly that it is often filled to the bursting point in the course of a single night. The fungus growth, after it has killed the fly, penetrates the insect's skin and spreads additional spores to be picked up, in time, by other flies.

If you will look closely when you see a dead fly clinging to a leaf or a stem, you will generally see a white fungus growth spreading from the insect's body, and holding it firmly in its tracks. The fly presumably went to sleep the night before with what seemed to be a bad attack of indigestion, but by morning it was dead. This fungus disease probably destroys more

flies in a season than all the fly sprays and tangle-foot devices combined. It is Nature's way of balancing.

Opportunities in Juniper

By DAVID F. COSTELLO

Book ends and lamp base to match make a nice combination for paired end tables. The lamp shade can be chosen to fit the surroundings.

THERE is a pardonable pride in being able to say of one of our possessions, "It's the only one of its kind." This is particularly true of handmade articles, especially when our handiwork has had the assistance of Nature's own inimitable touch. Nature has been especially lavish in the enchanting designs she has fitted into the gnarled limbs and branches of juniper trees. It takes only a little imagination to lift these patterns out of their rough bark and place them in harmony with our other decorative possessions.

The lamps, letter holders, vases, and book ends shown on these pages were made by Mrs. Henry Michaud in Fort Collins from juniper wood collected on the east slope of the Colorado Rockies. She first made them because she wanted something new, out of the humdrum, in her home. Their beauty fascinated her, and now what was once a need has become a hobby.

The pieces do not have to be visualized in the woods, although some imagination helps. Just bring

Two lamps and letter holders show the variety of articles that can be made from juniper combined with ingenuity and imagination.

Bud vases combine the beauty of both cross and longitudinal grain, while a knot or two adds variety and interest. A small vial should be inserted in each hole deep enough to be out of sight.

in a good pile of knotty, twisted gnarled branches, and even roots, throw them in the woodshed to dry, and you have a winter of work and fun in store.

The first steps require a lot of roughing out to remove the bark and smooth the surface. Mrs. Michaud's father, Mr. Albert Cooper, assists in this job by paring, and scraping and filing the pieces. A coarse file is used for most of the preliminary work; a wood rasp is too rough. Sandpaper and emery cloth begin the smoothing process and pumice stone in oil adds the final polish. Several coats of shellac alternated with polishing with pumice stone complete the process of enriching the natural grain of the wood.

But there are other tricks to the trade. It takes a careful job of boring with a long bit to provide the proper electrical outlet for lamps. Book ends and letter holders must be sawn evenly into matched halves. And good design, proper height, and proper balance require a deal of looking, turning, and measuring. Lamps with branches serving as legs require careful trimming to make them stand solidly and level. This can be done by setting the piece in place on a table and marking at a uniform height by a pencil inserted in a block of wood. The block of wood can be slid around on the table surface until all the branches or feet of the lamp have been marked for sawing. Strips of felt should be glued to the under surfaces of the finished articles to avoid marring the furniture on which they will be placed.

With lamps there is the final pleasure of selecting a shade to match. Or with vases, there is the choice of flowers for the best arrangements. Why not make some juniper articles for yourself? They will be custom-made and unique, the only ones of their kind.

★

Across the Night

By MAE WINKLER GOODMAN

Such beauty falls across the night
  As must constrict the heart;
A rose washed in the moon-soft light,
  Its petals blown apart—
Pale pools of silver at our feet —
  Stars tricked in an ebon lake,
And where the sky and branches meet,
  An owl, half-awake . . .

★

Snake Wise

By CARMEN STONE ALLEN

You may be an expert in identifying live snakes, but can you identify these ten by their descriptive titles? For example, "after sunset" would suggest a night snake, and, pardon me, "a pest" suggests a boa.

See page 386 for answers.

1—The male of the ox family
2—Skeletons of sea animals
3—An article of wearing apparel
4—A burrowing animal
5—A color
6—A ruler
7—A musical instrument
8—A beverage
9—A covering for the feet
10—A baby's toy

A "Fierce" Little Pig

By IRENE FINLEY

Photographs by William L. Finley

OUR meeting with Oscar, the wild pig, was not planned, and certainly the adventure ahead of us and its paradoxical outcome were never anticipated. Supplied with a substantial lunch, six of us drove from Tucson into the saguaro-studded hills to look for peccaries, called javelinas by the natives.

These tailless little pigs are not like the stodgy porkers of the pens. Built with flat, knife-blade bodies and battering-rams for head pieces, they slide through the cactus and thick underbrush seeking both food and excitement. The collared peccary is found only in the southern states, and a fiercer, larger peccary roams the jungles of countries south of us. In early days, when their numbers had not been depleted by civilization and they roved about in bands, it was no joke to meet them, especially when on foot. Having plenty of time on their hands, they liked to tree a man and keep him there for hours at a stretch.

There was once a bumptious individual who moved to a ranch in the Salt River region of Arizona and boasted that no wild pigs were going to interfere with his freedom on his own property. One day he was out on foot, looking at his line posts, when he met a little band of pig squatters that were there before he was. They ganged up on him, and one old boar rushed him from the rear and caught him with a tusk right behind a knee, hamstringing him so that he was helpless. The boar held on while the others attacked him. When they left him, he was a subject for a hospital and was laid up for some months.

We have met many peccaries, but always on the safe side of the fence. As a pet, a peccary is dependable and loyal to one person, a one-man animal and a good watchdog for his master's place, but we were not counting on getting chummy with any of them.

Stopping at a ranger's station for information, we met a guard at the gate, a full-grown peccary, feet planted squarely, poker-face telling nothing. No one else was around. We stopped, waiting for anything that might happen. All of us felt the general lack of sociability to strangers. Neither did we like the look of his "big teeth," nor did we dare to turn our backs and run away.

Oscar wore a coat of red, excelsior-like hair at six months. Below, getting acquainted with the peccary, who turned out to be a she.

Finally the pig, after taking plenty of time to petrify us, started toward us, gingerly planting one foot out with a hesitation before the next step. There was a growing tenseness in the air. Slowly he came on. A voice said, "Don't move." The pig, his mane bristling high on his shoulders, sidled up to one of the men, sniffed his boots, gave a couple of soft grunts, and rubbed against his legs. A sigh of relief came from somewhere.

One of the women edged away and came back with a head of lettuce, and dropped it on the ground. Lettuce was elixir to the pig, and he became engrossed in putting it away. Another head of lettuce was produced, dooming any thought of salad for our meal. But it was worth the price of a truce, and we now began to enjoy the pig—with reservations, for they are known to be temperamental. He moved about, rubbing shins with stiff bristles, grunting as if he had accepted us. We could not make him out. He was supposed to be making mincemeat of us. When we left he stood in the road as if lonely, and I watched him until we were out of sight.

Later in the afternoon we came back by the station, and there was the pig still on duty. This

time he came trotting up to us, greeting us almost effusively. Perhaps it was the memory of lettuce. The ranger was back and we got the whole story.

"Oscar's all right if there ain't no yellin' and jumpin' about," he said. "She's a year and a half old. I found 'er in a Mexican shanty in the hills. She was sick from lack of care and feedin'. At night she was sleepin' out in a pen with a doe deer and an orange cat. She wasn't as big as the cat, only about eight inches long, and was covered with red excelsior hair. She was tryin' to live on swill throwed out in the yard."

"Oscar, she—?" I thought. It seems that her caretakers did not take the trouble to find out that she was a girl piglet, and later on the name stuck.

We played with the pig, took her out walking in the cactus, and when we came back to the car we filled a tin dish with left-overs from our lunch. She pitched into it, grunting satisfaction, or appreciation.

The next day, Lieutenant Owen, commissary officer at M Field, took two hundred boys and trucks full of food out near the ranger's station for a big send-off before the boys were transferred to L Field at Phoenix. I had warned the Lieutenant to be careful of the pig at the station—"no yellin', no jumpin' around."

In the evening when the bunch came back to town, the Lieutenant had the laugh on me about that "fierce little peccary" chewing up the boys if they got noisy and rough with her. It seems the ranger himself was aghast at the way she took to uniforms. She ate with the fliers, devouring everything from bologna to beans, cake and ice cream. Quite a change from roots and acorns of the desert.

In the afternoon, they tossed dice to see who would take her riding next in his jeep. So she went sailing around the yard, high, wide, and handsome, a veritable little Jezebel of the streets. Oscar forgot she was a "lady," and that she was a savage little pig.

★

A Tamandua anteater is well equipped to tackle one of the termite structures, and here surveys a juicy meal. At the right is an enormous cone built by the termites from pulp and clay. It measured eleven feet, three inches in height and was thirty-one feet and nine inches around the base.

Termite Castles in Panama

By CLARENCE H. MacDONALD

Ants and termites have neither interested nor fascinated me much, because both mean either a stinging or a wood-hungry insect that takes great delight in devouring the very foundation of your home right from under you. However, one of my scientific friends in Panama urged me to see something quite different in the insect field.

So up we went, first through beautiful, rugged jungle country, then down to a plain that resembled a section of our own West. Approaching our quest, we saw a rare sight. As far as one could see, coming right out of the ground, were hundreds of structures ranging from mere knobs to unbelievable conically shaped nests that were more than eleven feet high and thirty-one feet around at the base. They were indeed startling, resembling giant ice cream cones upside down!

A termite is a peculiar insect, but it certainly knows how to construct a weather-proof home in Panama. These giant cones were made of leaf and wood pulp, plus clay, which made them look like a well-done cement job. When we chopped into one, we found cells or compartments filled with thousands of tiny, white termites. They poured out like angry hornets and were quickly all over us, but they did not sting. The anteaters of Panama really go after them. Little wonder that the anteater is equipped with such powerful arms and claws, because he needs both to crack open one of these cement-like insect castles of sun-baked pulp and mud. Our heavy machetes hardly made a dent in the one we tackled. However, cracking them open, like a monkey with a coconut, is strictly an anteater's own little problem!

Amateur Astronomer Builds His Own Telescopes

By IRENE KOERNER

Mr. Nilsson shows off one of his telescopes. Inset, a mounted telescope.

FOLKS who go star gazing with N. E. Nilsson, amateur astronomer of Springfield, Illinois, listen with intense interest as he points out the nebulae overhead or sweeps the sky for double stars. They look through his telescope, ask questions about the skies, confident that he can answer their questions.

Others come to indoor meetings to listen to his star talks. Many go on hikes with him, especially during the Christmas Bird Census, knowing that he can identify any species he sees, thereby making their lists authentic. They recognize Mr. Nilsson as an artist and expert photographer, too.

Few, however, who know this amateur astronomer well, know that he builds his own telescopes. Mr. Nilsson himself is too modest to advertise the fact, but consented to give details of their construction in the hope they might aid others.

He has recently built a six-inch refractor at a total cost of $24. Of this amount $11.60 was spent for mirror blanks and abrasives, eye piece and diagonal. He also bought a hexagon tube of wood and some concrete for a counter weight. A mount for the refractor was made of second hand pipe fittings.

Mr. Nilsson has built several two-inch refractors and a few six- and eight-inch reflectors. One of his six-inch reflectors was built in a total of nineteen hours actual work.

The telescopes are put through a rather elaborate series of tests on the various zones. He tests each mirror to see how far off it is from theoretically perfect.

The telescopes and mirrors have various uses. With the 38⅜ mirror he can see veins, serrate edges and worn holes in elm leaves more than a block away. For this he uses the bare mirror in daylight, but of course with a high-powered eye piece. This mirror, ground to a short focal length of 38⅜ inches, is called an R. F. T. among telescope makers. It means richest field telescope, and is used mostly without a mount to explore sky areas overhead.

Mr. Nilsson can sit in a lawn chair in his own backyard with his instrument between his knees and against the chair. He looks horizontally into the eye piece while he sweeps the heavens for nebulae or double stars. The eight-inch telescope is used for observing planets. He sets it on a planet, clamps the Declination Axis, and follows the object as it rotates on its polar axis.

For photographing eclipses Mr. Nilsson uses a two-inch refractor. This gives an image of the moon approximately one inch in diameter. He finishes his own photographs of eclipses, too. He makes sky charts, then makes photographs of the charts.

Friends of Mr. Nilsson are happy to see his Nature pictures in their favorite magazines. *Nature Magazine* for February, 1947, carried his full-page picture of restored cabins at New Salem State Park.

Nils Edward Nilsson began his education in a rural school in South Dakota. He was graduated from the High School at Gary, South Dakota, and attended South Dakota State College, receiving, in 1908, a Bachelor of Science degree in Engineering.

His interest in sky study began in 1910 when he had some courses in astronomy. For the past twelve years he has given star lectures to church groups, sororities and Nature clubs. He has calculated eclipses several weeks in advance, and checked their performances.

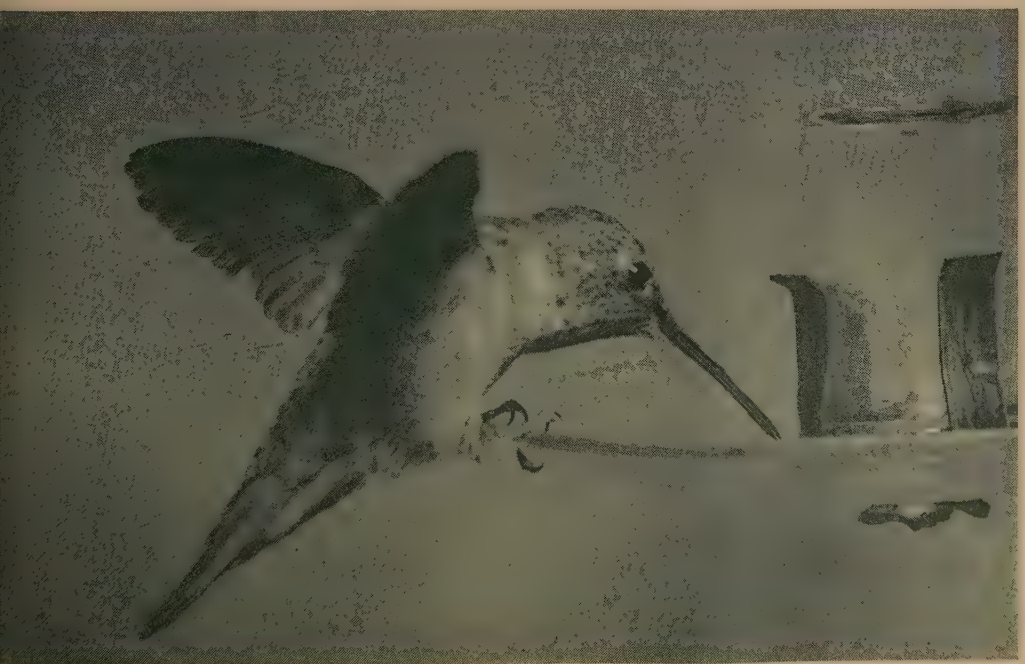
Homing Hummer

By WALKER VAN RIPER

Photographs by the Author

THAT A tiny bird with a body no larger than your little finger should be one of the best flyers and one of the best homers among birds is striking and interesting. "Precision Homing," the story by Raymond Tifft Fuller in *Nature Magazine* for April, 1947, reminded me of a broad-tailed hummingbird that built its nest in the same spot on the branch of a maple tree near my bedroom window for three years in succession. I felt confident that it was the same bird each year, not only because she nested in the identical spot, but also because of the familiarity she appeared to show with the feeder in the back yard.

This feeder has hung for some years in the same place, and I usually wait to put it out in late spring until reminded by the sight or sound of a hummer in the garden. A bird that flies to the feeder within a few minutes of the feeder's first appearance may reasonably be thought to be guided by memory dating



Using high-speed flash equipment and exposures of 1/30,000 of a second, the photographer was able to stop the broad-tailed hummingbird, above, just before it landed on the edge of the feeder, and to photograph it, left, with wings stopped and spread, after it had grasped the feeder's edge.

Getting pictures of the hummer at the nest high in the maple was not as easy or as successful as the shots taken at the feeder. However, using high-speed equipment, Mr. Van Riper, who is with the Colorado Museum of Natural History, was able to catch the little bird, as shown here, just as it landed on the nest, then as it started to settle down, and, finally, on the nest.

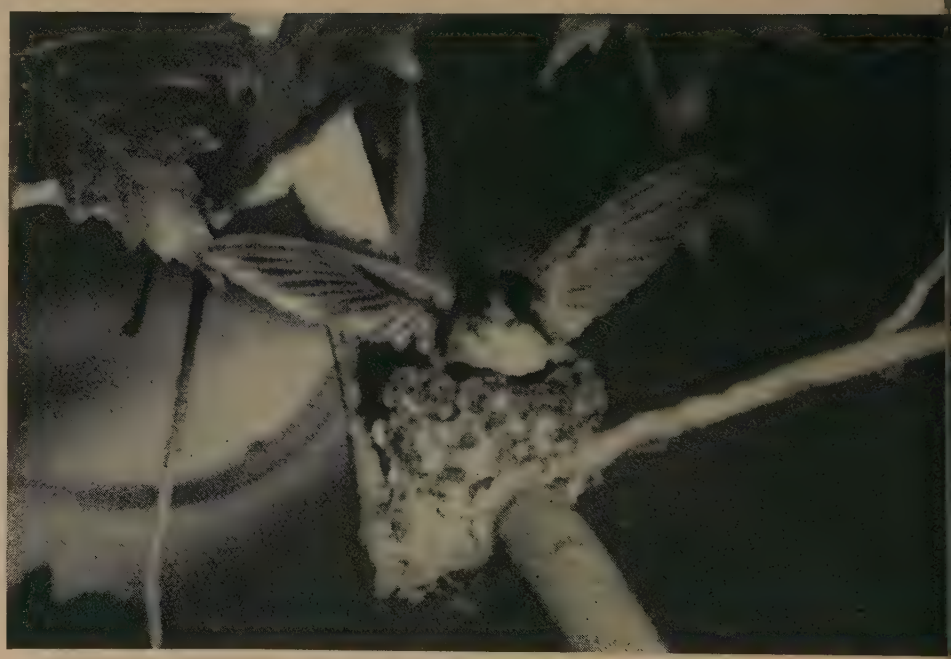
back to the previous year. This behavior I noted, at least twice, on the part of the litle bird that built her nest in the maple.

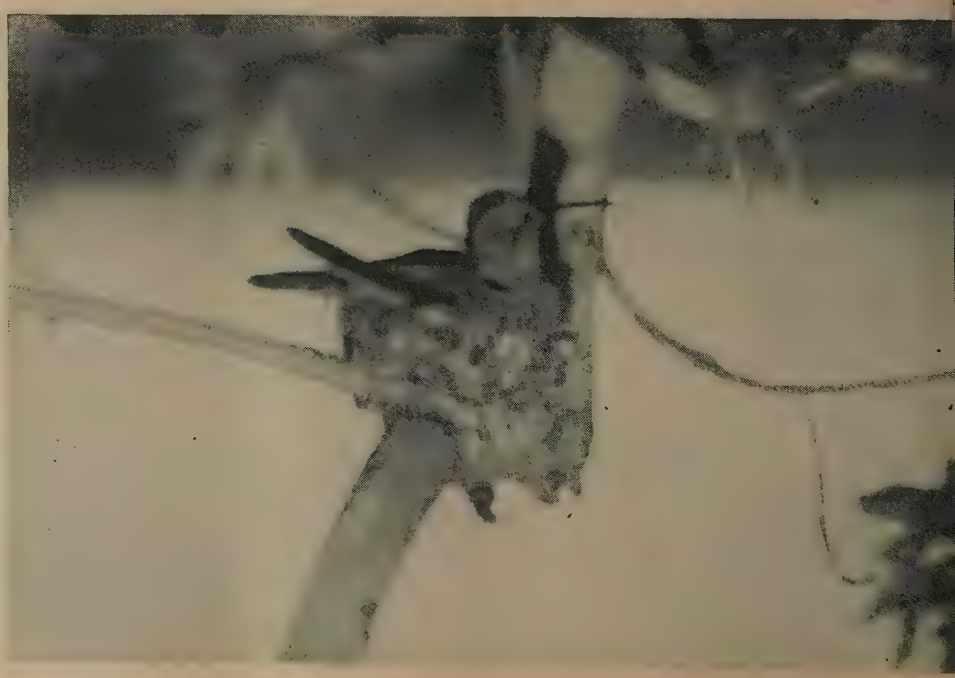
Pictures of the bird at the feeder were comparatively easy to take, and I made dozens with the high-speed flash at exposures of 1/30,000 of a second. Taking the bird at her nest, however, was a different matter, as the nest was opposite a second-story window and twelve to fifteen feet away. I ran the flash out on the longest pole I could find, and pushed the camera out on a ladder propped in the window as best I could. The results were not too good, but of some interest.

The feeder shown in the picture is, by the way, a most satisfactory one, and easily made by anyone who can do a little glass-blowing and drilling. It is made of a large test tube, eight inches by one inch wide, with a ring, by which it hangs, drawn in the bottom. The saucer is a three-inch watch glass with a hole drilled in the center. Through this is fastened the brass clamp that holds the saucer to the lip of the tube.

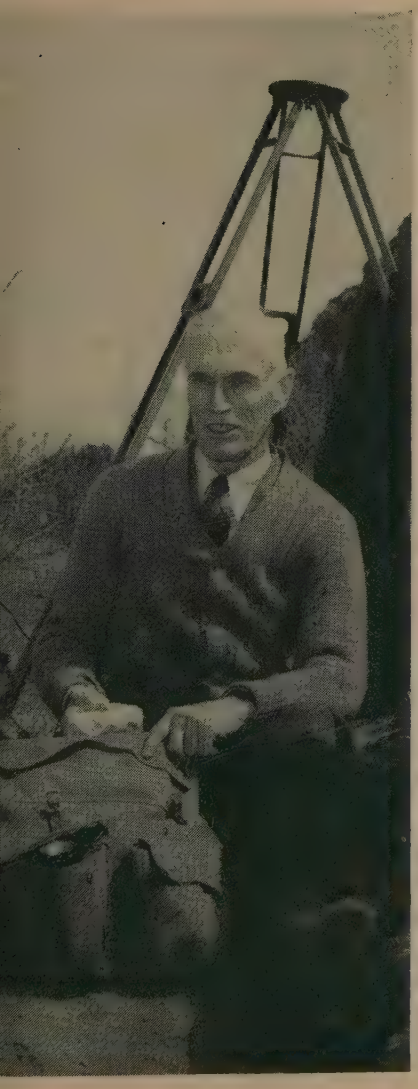
I have, in my loft, several racing pigeons that have flown the 500 miles across the State of Wyoming from Glendive, Montana, to Denver. Some of them have done the trick three or four times. But none of mine has ever done it in one day's flying. In fact, this feat has only been accomplished by Denver pigeons three times in twenty-five years' trying. This is a good standard against which to test the hummingbird's flying and homing ability. The little bird pictured here made a round trip of at least 3000 miles—possibly 5000—each way three years in succession, flying from winter quarters in Central or South America to the nesting place in Denver and back again.

How far she flew non-stop is, of course, not known, but it is generally agreed that the ruby-throats of the eastern United States must all fly at least 500 miles across the open water of the Gulf in their migrations. This, of course, is a non-stop flight.





This picture of Pikes Peak from the north is perhaps the most widely known and distributed of Harry Standley's mountain pictures. He snapped it casually twenty years ago when he had stopped to fix a tire. At left, Mr. Standley surrounded by his photographic and mountaineering equipment, both of which have served him well.



Cameraman of the Rockies

By MARSHALL SPRAGUE

EVEN though he has produced more fine photos of the Colorado Rockies than any other living man, Harry L. Standley is known to relatively few people. Since 1895, when at fourteen he began taking shots of Cripple Creek miners, he has been careful to keep himself hidden. On retiring from business recently, he balked like a mule before consenting to a May, 1947, exhibition of his work at the Fine Arts Center in Colorado Springs, where he has lived since 1904.

During that show, facts emerged that Mr. Standley's best friends did not know. Born in Kansas in 1881, he grew up, almost unschooled, in Pueblo and Cripple Creek, Colorado, and decided early that he preferred toting a tripod in the wilds as a bachelor to pushing a baby carriage. For years, his mountain photography was merely a means to the production of photographic pillow covers for tourists. Then, in 1921, he joined the Pikes Peak group of the Colorado Mountain Club. "After that," he says, "I took mountain scenes just because I liked to review the wonderful things I'd seen."

So Standley, the photographer, joined forces with Standley, the alpinist. Since 1921, he has climbed every one of the 52 Colorado peaks with an altitude of more than 14,000 feet, and he is the only man known to have photographed each of those peaks from above timberline. On December 31, 1922, he was one of five men who struggled up Pikes Peak to stage midnight fireworks, thus founding the famous AdAmAn Club of Colorado Springs, which repeats the ceremony annually. Standley has missed only one of those arduous climbs and he has served for many years as club president.

At 66, Harry Standley is a quiet, gentle man with a trim, slight build

Harry Standley has not been a wildlife photographer, but, loving the outdoors, he has made Nature shots for his own enjoyment. He paid one peanut for the privilege of photographing this park marmot at the left, above. The long-crested jay above is one of the photographer's friends at his Carroll Lakes cabin, the location of which he keeps a secret from most people so that he can enjoy his wild neighbors. The blue grouse at its nest at the left, and the snoozing baby sandpiper, are also Carroll Lakes friends, while the white-tailed ptarmigan, below, still in winter plumage, was almost stepped upon when Standley was seeking a good view of Tabeguache Peak.

that hardly suggests the oak fibre of his frame. He approaches mountaineering (no retiring from *that!*) with the simplicity of a timberline pine, and he has learned to be comfortable in bitter weather with equipment that most of us would think inadequate for an afternoon's hike through Van Cortlandt Park.

His thousands of photographs in books, magazines, newspapers, on calendars, and tourist maps and circulars, have made millions of Americans thrill to the beauty of Colorado mountains.

The saucy Canada jay above, and the porcupine at the right, are both friends at the Standley Carroll Lakes hideout, and the broad-tailed hummingbird on its nest was also found there. While climbing and taking pictures well above timberline on Mount Sherman in the Park Range, the photographer came upon the white-tailed ptarmigan, below, this time clad in its September garb. Typical of Standley's mountain pictures is the one below, right, showing Hagerman Peak, with Snowmass Mountain to its right. Hagerman was named for the well-known alpinist, Percy Hagerman, who is now president of the Colorado Springs Fine Arts Center.

Standley's pictures have few peers technically, which would seem to indicate all the mysteries of ultra-modern photography. Back in 1895, however, Harry snapped his first Cripple Creek shot with a battered Premo #7 that looked like it also could catch rats. In rounding out his pictures for the Fine Arts Center show he used another old rat-trap, a Premo #7, virtually the same simple instrument of a half century ago! In between, of course, he has used a variety of cameras to record his many fine scenes.

Tomato Sphinx Moth

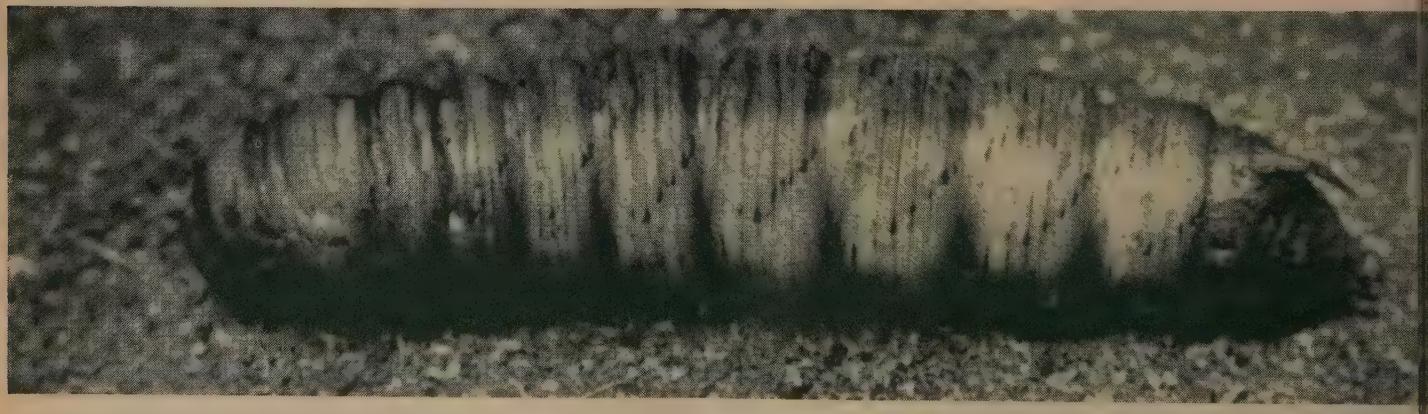
Photographs by Lynwood M. Chase

IN GIVING the name Sphingidae to the family of insects we know as sphinx moths, entomologists sought to describe the rather sphinx-like attitude of the larvae of these moths when the front part is elevated and the head drawn in. These moths are strong fliers and attractively colored, and many of them are known as hawk moths or hummingbird moths. Most of them have rather stout and tapering bodies, and their wings — particularly the hind wings — are comparatively small in proportion to the body.

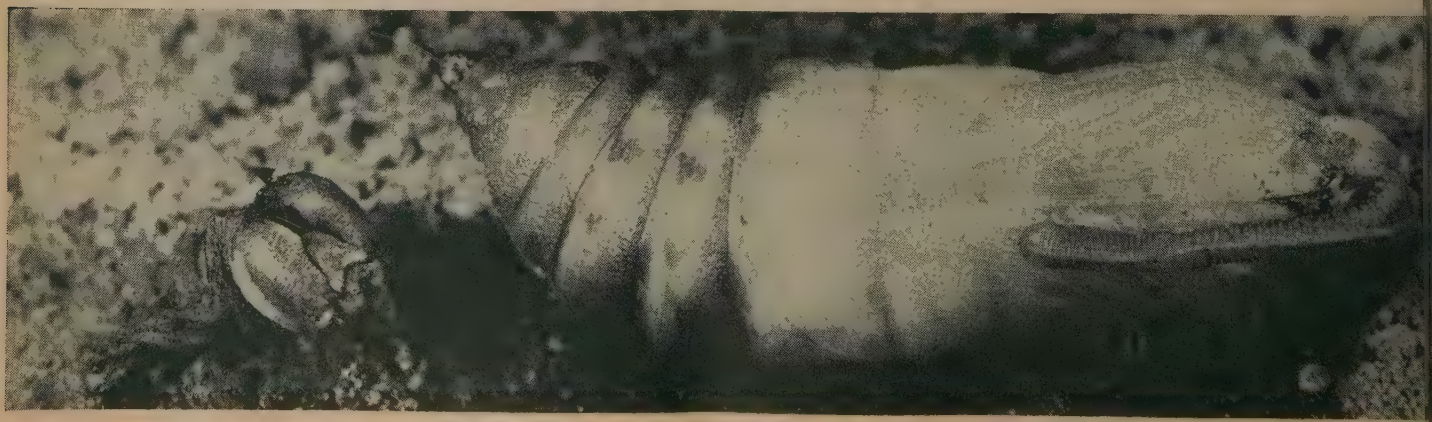
Except when very young, the caterpillars of the sphinx moths are without hair. Some species have a horn at the hind end of the body, but this is entirely harmless. The moths have long tongues, which, when the insects are at rest, are curled up under the head like a watch spring.

The various stages of the species shown here are of the tomato worm sphinx moth, known to science as *Phlegethontius quinquemaculatus*. The specific part of the name

The larval tomato sphinx moth on the stem of the host plant, with the forepart of the body elevated and the head drawn in, showing the sphinxlike attitude. Inset is the enlarged green, spherical egg laid by the moth on the host plant.



Above is a closeup of the tomato caterpillar just before it goes into the pupal stage, and, below, is a closeup of the pupa shortly after transformation from the caterpillar.

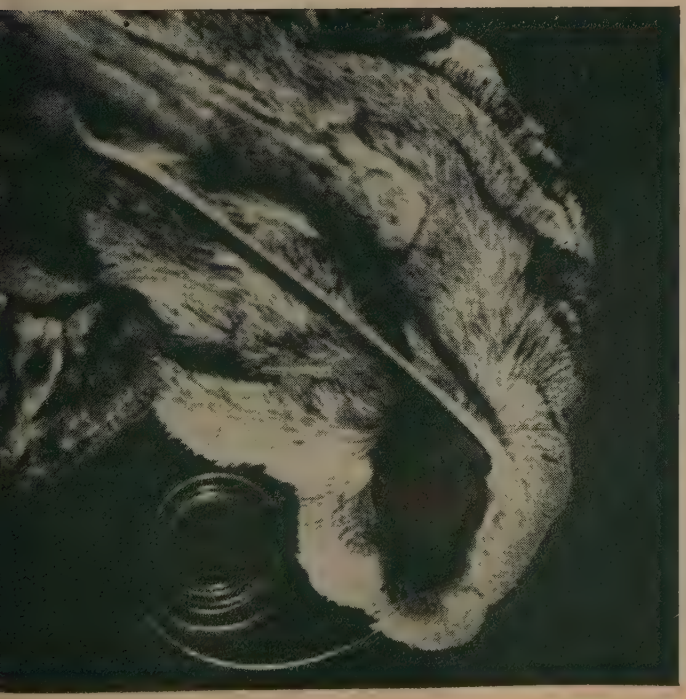


The adult tomato sphinx moth with its wings outspread and showing the interesting and attractive markings on the wings and the body of the insect.

comes from the five pairs of yellow spots on the body of the adult male moth. The wingspread is about four and one-half inches.

The females lay large, green, spherical eggs on the leaves of the plants upon which the caterpillar, which soon hatches and becomes as long as three inches, will feed. In about four weeks the caterpillar is ready for the pupal stage. The caterpillars feed on leaves of tomato, potato, tobacco and similar plants, while the adult moths feed on the nectar of flowers. Thus, while the larvae may be destructive, the adults help in the pollination of plants.

Some species, also called hummingbird moths, are unmothlike in that they are seen flying in the bright sunlight, hovering at flowers much like hummingbirds. Indeed, parts of the wings are transparent, the wing scales believed to be rubbed off as these moths emerge from the pupal stage. To come to know the sphinx moths well it is necessary to consult such books as Holland's *Moth Book*, for there are more than one hundred species of these odd and interesting insects.



Below is a closeup of the thorax of the tomato sphinx moth showing the strange design, which resembles a quite hairy face. Below, at the left, is an extreme closeup view of head of the moth, showing the antenna, the eye, and the long, coiled tongue of the insect. The latter is moved slightly out of position so that the watch-spring-like aspect of this long tongue may be seen effectively.

Graphic evidence that the telephone companies in California have a maintenance problem is presented in these pictures made by John E. Davis of Berkeley. Looking up the pole we see the results of amazing activity on the part of California woodpeckers, which certainly were laying by for a rainy day. The closeup of the pole shows how the acorns were inserted in the pole after the birds had done an efficient job of boring holes. Below are some of the long, spear-shaped acorns borrowed by Mr. Davis and photographed with a ruler to show their size. The acorn-woodpecker display was photographed near Mt. Diablo, California, twenty-five miles east of San Francisco.

As We See It

VICTORY FOR WILDERNESS

CONGRATULATIONS to all friends of wilderness preservation for their effective show of sentiment, and to Lyle F. Watts, Chief of the U. S. Forest Service for his decision against permitting exploitation of the San Gorgonio primitive area in San Bernadino National Forest, California, for downhill skiing. After extended hearings on the issue, it was the ruling of the Forest Service Chief that this area has higher public value as a wilderness and a watershed. Thus has been averted a dangerous precedent that threatened to break through the none too sturdy protection thrown around such all too few reservations. A small section of the San Gorgonio area that already has several structures and usable roads was eliminated from primitive status and will be available for wilderness skiing without affecting the rest of the wilderness. The voice of the American Nature Association was one of those heard against the proposed erection of ski lifts and concomitant development, and we are happy that the chorus we helped to swell was heard.

PRODUCTION vs. CONSUMPTION

A GUNNER whose conscience evidently troubled him once wrote: "Quail-shooting is hard upon a soft heart. It requires some excitement and heating of the sporting blood to make us forget the attendant brutality . . . but finally we must fall back on the excuse that we . . . are not yet vegetarians, and so long as meat is eaten, some living creatures must be sacrificed to our appetite."

And he continued: "Of course the whole killing business has its cruel aspect, but I am accustomed to salve my conscience with the reflection that I am not yet persuaded to become a vegetarian and the slaughter of all birds and beasts to be eaten is equally cruel. When we eat a partridge, we may indirectly save a chicken's life."

But he missed the point, namely, that man has some color of right to kill and eat chickens or other creatures he has reared but none at all to those produced in the wild. Taking them is predation pure and simple, and man's hand is ever against predators (except himself). Civilization begins with husbandry and its level may justly be measured by the extent to which supplies are produced, not pirated from Nature. It is only animals raised on fur and game farms that we can consume with as much right as we do livestock.

In the domain of sport, the only comparable slaughter is that of pond-reared fishes released in streams for immediate catching and pen-raised game birds put in coverts just ahead of the guns. And what noble sport that is! Even the products of restocking, after one breeding season, are in part of the wild and to that extent less claimable as the property of man. The only way to have a really clear conscience in this matter is to refrain from killing all wild creatures in the name of sport. If we do that, there may be something left to fall back on in time of need. If we go on as we are, we shall certainly exterminate additional forms of wildlife, thus putting ourselves in the same class with the descendants of slaves, who on various West Indian islands have killed and eaten every creature that would yield a morsel of flesh repaying the expense or exertion needed to possess it. And we shall do it with even less excuse, for in our time no man need go hungry for lack of the flesh, or cold for lack of the pelt, of some wild creature.

Constructive production, not parasitic consumption, should be our aim. To produce before consuming is the cure for the justly bad conscience that a few more enlightened sportsmen may now have. As for the others, failing utterly in every conservation sense, there is no hope in them for the perpetuation of wildlife. *Contributed.*

FRIENDS OF FURBEARERS

FOR many years the late Commander Edward Breck fought the good fight against the inhumanity of the steel trap, and in behalf of humane methods of procuring furs for milady's adornment. Mrs. Breck carried on the work as long as her health permitted, then passed the banner on to that valiant little soul, Miss Lucy Furman of Kentucky. Now Defenders of Furbearers has been organized on a national basis, with Delos Culver as president, Miss Furman and Mrs. Breck still active, and other friends of humanity and our furbearing mammals as officers, directors and sponsors. This organization, which fills a void in the wildlife conservation field, seeks "to promote, through education and research, the elimination of cruel traps and all other painful methods of capturing or killing furbearers everywhere, and the protection and conservation of such animals." These objectives will be accomplished through educational programs exposing existing reprehensible methods, by encouraging use of, and proper labelling of, farm-raised and non-trapped fur and fur substitutes, by research into the development of non-injuring traps and into sound methods to conserve and increase the numbers of furbearers. This new-old organization deserves the active support of all humane-minded Americans and sincere conservationists.

HENRY G. MAURICE is President of the Zoological Society of London, Secretary of the Society for the Preservation of the Fauna of the Empire, and a member of the Commission of the Institute of the National Parks of the Belgian Congo. Recently he made an address at a meeting under the auspices of the latter organization, speaking in French. This address, ably translated by Charles W. Porter, was brought to our attention by Dr. Carl P. Russell of the National Park Service. So splendid were thoughts presented by Mr. Maurice that we wrote him, asking permission to adapt his talk to article form, permission that he graciously granted. We are happy, therefore, to present here "Speak to the Earth", an article of outstanding significance and one worthy of the attention of every intelligent person today.

Speak to the Earth

By HENRY G. MAURICE

FROM time to time, when I speak of our duty to conserve wildlife, I am asked the question, "Why and for what purpose should we conserve it?" It is a question that evokes a number of answers, but there is one answer that comprehends just about all of the others: It is that man is under the greatest necessity to learn the verities of life, at least so far as to understand the ecology in which he belongs.

At the present time the entire civilized world is, I believe, more unfortunate and more miserable than it has ever been before in the uneven course of the history of civilization. There are, of course, ignorant and unthinking people who are enjoying a false prosperity, or, in any case, a precarious prosperity; and they think themselves happy. But really intelligent people are unable to contemplate the world today without grave misgivings. I dare say that never before in the history of the world has one seen so much hatred among nations, between individuals, and even between former allies.

Civilized man himself has created the evils from which he suffers. The progress realized in the domain of the physical and chemical sciences has passed beyond the ability of man to regulate his conduct according to the power that the sciences have given him. One may say, without exaggeration, that man has usurped the powers that belong to God, and finds himself today armed with forces that neither custom nor his mind renders him able to control. The actual state of the world gives a new significance to the commandment given to the first man in the garden of Eden: "But of the tree of the knowledge of good and evil thou shalt not eat of it: for in the day that thou do eatest thereof thou shalt surely die."

From century to century, at the same time that he has acquired greater knowledge of science, man has become more destructive. As Byron said, "Man marks the earth with ruin." His destructive power has destroyed the wild animals, the birds, forests, flowers, with an ever increasing fury, which always gains added force, and is even striking down his own species. At the same time, mankind has become more and more unfortunate because, while he has obtained, or at least rendered possible, a certain increase in his physical well-being, his spiritual self and his peace of mind have to a large extent disappeared. He has tasted of the tree of knowledge of good and evil, and he has chosen evil. He has all the appearance of approaching the hour of the fulfillment of the prophecy of his doom.

One of my friends, an eminent man of learning, said to me one day that if it were left to him, no one would enjoy the right to vote until he had completed a course in biology, and in order to be a minister he would exact, at the very least, a college diploma in this branch of study. If this were true, said he, we would not have so many "isms", because the "isms" are based on false biological premises.

To adopt such a law today would be a veritable revolution; but I realize that my friend wished to express, simply and in the most energetic way possible, a truth that I consider fundamental. The greater part of our civilized people live in great cities. They live far from Nature, and their amusements are as the rest of their manner of living. That is why many of them have given their ears to doctrinaire theories that do not correspond at all to the realities of life. Those who propagate these theories are as ignorant, as are those who listen to them, of the truths that may be learned from the study of life itself. Their false ideologies give rise to pernicious tendencies that engender hatred and war.

For some time I have asked myself—and what serious man has not raised the same question with himself?—if there is not some way of resolving the problem that mankind has posed for his children. How can we turn men from the road that leads to destruction? Always this same answer has come to me: That man, being a living creature, should occupy himself with living things. I do not mean that he should

not occupy himself with the means of gaining a livelihood, but that he should study the life that surrounds him in Nature. He should give consideration to his environment, and regard himself as a citizen of the world of living creatures, having a role to play among the beasts and the birds, and above all, among his fellow creatures—a role that consists in accomplishing the fundamental design of creation as a whole. This design, if I am not mistaken, is to render terrestrial life more animated and more complete, so that the spiritual life in which we are permitted to take a part, if we have the will and desire to do so, shall play a role that is more and more useful. In this way, man will be led to attach less importance to power and more to good will. This is what the world has need of at the present time—good will.

"Where there is no vision, the people perish." We should like to see the world give more evidence of good will; good will governed by the idea of living and letting live. Today, this is not the case, and the people perish. Is it possible to turn mankind from instruments of hatred and, by the medium of Nature, put him on the road to good will? First of all, if man wishes to study Life he must cease to destroy it. "Live and let live" might well become the motto of all organizations seeking to encourage the conservation of wildlife. Our purpose, above all, is to persuade the people of different countries not to exterminate any species of animals. Moreover, since animals are unable to live except in surroundings to which they are adapted, and since we ourselves are unable to get along without soil and water, which depend for a large part on the conservation of forests and swamps, we should, for our own good, conserve these surroundings intact. In sum, we are looking toward the protection of wild animals and plants in accordance with that methodical order that we call natural balance.

There is no need to cite the many species of animals that at one time freely wandered over the various regions of the world, but which have disappeared forever. We are not always able to determine the cause of their disappearance, which in the case of some of them is perhaps to be attributed, in a certain measure, to natural causes. There is no point in discussing the catastrophes of Nature, since there are no means known to us for controlling them. But, in the course of recent centuries, and even in our memory, many species have been exterminated either directly or indirectly by man. Among these animals there are some that are extremely wonderful, especially from the point of view of science. They are remarkably interesting, and each has a role to play in the ecology of the world. They have disappeared, or are threatened with extinction, because of the greed or carelessness of man.

It is necessary to add that increases in population, and encroachments upon the wilderness areas for purposes of developing agriculture and exploiting forests and minerals, cause wild animal life to become increasingly more and more threatened. Then, too, in the name of Science, museums are constantly at work making zoological collections, while other persons or organizations championing medical research claim the right to take captive the great anthropoids, and are bringing them back alive for the purpose of experiments. I shall not pretend to discuss the doubtful value of such experiments, nor shall I try to maintain the thesis that the real necessities of human life should be sacrificed in the interest of wild animals. I merely wish to point out the single fact that animals are everywhere threatened with extinction; that it is necessary to be constantly on guard against unfounded arguments; that we should not sacrifice things we can never replace until we are absolutely convinced that such a sacrifice is really necessary, and will not be attended by unwelcome consequences.

How then are men to be persuaded not to destroy, but, on the contrary, zealously to protect that which remains of these species? How can we persuade the different peoples of the world to reach an accord in these matters, and to abide by their promises? Is it not certain that before everything else they will ask us: "What material gain do you have to offer? Is there any money in it? Is it a way to put additional food into our stomachs? Will we be able to live more easily and more pleasantly?" In short, is it possible to appeal to the cupidity of men in order to assure success? For example, in 1937 and 1938, I helped to negotiate two international conventions for the protection, respectively, of fish and certain species of giant crabs. We were able to reach more or less satisfactory agreements, because the delegates

Beside the Still Waters

By MARGARET MITCHELL BERRYMAN

Beside still waters, where the willows lean,
And placid kine drowse in the scented air,
Where light wings flash across the shining green—
How sweet to linger and find solace there!
Bird carol, drone of bees, the wind's faint sighs,
Rustle of poplar leaves, that fleetly show
Their silver—these, like muted lullabies,
The soul disheartened soothe, and peace bestow.

What stained glass to sunset can compare?
What pillars statelier than soaring pine?
What spirit's surge spontaneous as the prayer
Beauty of earth evokes, where His design
Is manifest? Tread on the fragrant sod,
Rejoice in sky, woods, waters, and find God.

were convinced that, in the long run, there was an advantage to be gained by foregoing large profits, immediately, in order to insure more or less modest gains regularly from year to year. The scheme hit upon consisted in leaving enough fish and enough crabs to assure a satisfactory annual increase.

Is this a valid argument for the conservation of wildlife? It must be admitted that economic arguments, although occasionally found, are not always valid. It is possible to sustain the thesis that wildlife will attract tourists who will spend their money in the regions they visit. But it is an argument that carries little conviction for the individual. It is possible to demonstrate that agriculture benefits from the conservation of waters and forests, and one can even point out that Nature sometimes takes revenge in unexpected ways upon those who disrupt the natural balance of Nature. But men care very little about such probabilities. They are principally concerned only with material gains. On the other hand, the conservationists are seeking to promote the intellectual and moral well-being of the world.

This last is a question that depends more on the people themselves than on their governments. If the governments will, on their own accord, hold to their international agreements, so much the better, but if the treaties are not enthusiastically supported by the people, we may be sure that the treaties will be worth little. To those of us who have much heart, the conservation of Nature should preach a new Gospel, which, to tell the truth, goes back to ancient times.

Consider these lines from the Book of Job:

"But ask now the beasts, and they shall teach thee; and the fowls of the air, and they shall tell thee:

"Or speak to the earth, and it shall teach thee; and the fishes of the sea shall declare unto thee.

"Who knoweth not in all these that the hand of the Lord hath wrought this?

"In whose hand is the sound of every living thing, and the breath of all mankind."

Now compare the following thought extracted from the *Koran:*

"There is no beast on earth, nor bird which flies which is not a people like unto yourself, and they all go back to God."

In the day and age in which we live, one rarely hears the holy Scriptures quoted, and it is even more rarely still that one hears an admission of their infallibility. As for me, I do not ask acceptance, in its literal sense, of either the book of Job or the *Koran.* However, I dare suggest that each of the extracts expresses a fundamental truth, and that the quotation from the *Koran* conforms generally to the theory of evolution of living things, including therein the human species. The course of this evolution, it goes without saying, is still enveloped in mystery. It is not my purpose to discuss the facts and the theories relating to the evolution of living beings; it is a task that I leave to the experienced biologists. As for me, who studies natural history as an amateur, it is sufficient that people like me admit that man partakes of a common origin with the beasts of the field and the birds of the sky, and with reptiles and fish. It is on this fundamental fact that one may base invitation to all those who desire to learn the truth concerning man, and the connecting links that bind him to the universe, and permit themselves to be taught by the beasts and the birds and to speak of the earth, mother of all living things.

The English poet, Pope, said: "The proper study of mankind is man." That was well said, but in order to understand man, one must study him in relation to the ecology in which he moves and of which he is an integral part. I do not promise that such a study will enable us to discover a remedy for all of the ills with which man is afflicted, but I believe that I can affirm that it will be impossible for us to understand man and the problems that assail him, unless we arrive at a genuine understanding of the relationship that exists between man and the world of living animals. In the course of such a study, we could not fail to admire the marvels and the beauties of Nature, and in comparing the customs of man and those of wild animals, we would come to understand that those which we call in an insolent fashion the inferior animals are capable of furnishing us with useful examples of tolerance and good will. And, moreover, in the midst of the feeling of despair that pervades the world, and the misfortunes that flow from it, is it not possible that, through the contemplation of the harmonious balances and constantly renewable beauties of Nature, hope will be reborn, accompanied by a spirit of humility, source and indication of true wisdom? The world that man made is ugly—physically and morally ugly! To put an end to the actual progress toward ugliness, destruction, rapaciousness, and bad faith, it is necessary to interest man in an opposite point of view. What I propose is a study of Nature. To add my profession of faith, I will admit that after having contemplated the universe, so methodical in its manner of procedure,

Acorn Atoms

By CHARLES EDGAR GILLIAM

Imprisoned in this shell
Is ordered energy
Which, filtered, shapes a tree,
And seeds new oaks from old
Eternally.

God wound each atom well.
When kissed by suns and rains,
They work in endless chains
To create boundless good
On hills and plains.

But break the mystic spell
With scientific might
And they explode with light
That brings to oaks and men
Eternal night.

the universe of which we are such an insignificant fraction, it is impossible for me to believe that *the universe* results from any kind of an accident, and that it does not depend upon one Great Spirit who reigns over it and directs it, and with whom, if we play the role that is expected of us, we may hope some day to be in communion. I admit the difficulty that there is in rendering an account of all the manifestations of such a Spirit, but I find it still more difficult to explain to myself an accident that is so methodical.

About twenty years ago, Miss Vivienne De Watteville went into Africa with her father, who had been sent there to make a collection of wild animals for the Museum at Berne. Before completing his task, he was killed by a wounded lion. The daughter buried her father and continued his work, which she completed. Ten years later she put into execution an enterprise that she had proposed to herself from her very first visit to Africa. In spite of the efforts of her friends to dissuade her, she returned to Africa, and having taken some of the equipment of the natives that had been discarded, she herself went, without other companions, through the forest to live as a peaceful visitor amidst the wild animals, trying to establish with them relations of good friendship. I do not say that she succeeded completely, but she lived a long time alone among the beasts of the forests, including the elephants. On her return, she wrote a book of stirring beauty, to which she gave the title chosen for this article—"Speak to the Earth." She had, in truth, spoken to the Earth. She had learned to understand the spirit of the lessons that the Earth is capable of giving. She tried in her book to transmit to her readers the fruits of the lessons that she had learned.

Recently, Sir James Barrett died in Australia. He was erudite, well known, and distinguished. He was an especially ardent proponent of the conservation of wildlife. An obituary notice said: "He gave evidence of unusual insight. He understood that in the long run the National Parks, the Reserves, and the laws and rules governing them would be worth little without the support and cooperation of the common people. That is why he sought to consecrate himself to the awakening of the curiosity of children." "We shall not be saved," he said in writing to me, "except through the medium of children." And, again: "I think that in order to achieve our purpose it will be necessary to give attention to the system of education in the schools, with a view to bringing about a changed outlook." His dearest hope in the course of the last years of his life was to inculcate into the children of Australia a love and a comprehension of that which is beautiful, and he sought to achieve this end by developing among them a taste for the study of Nature and Music.

He largely succeeded, and before his death he was able to say that children were already playing a role, and even a preponderant role, in the campaign to conserve that which remains of the wildlife of their country.

I am sure that Sir James Barrett was right. It is necessary to direct our young children, who are today especially interested in machines, to the study of Nature in order that they may understand that they are the ones who are to inherit it, and that, in calling upon Nature, they may attain wisdom, from which comes good fortune. In truth, it is Nature who, better than any other teacher, should render them capable of distinguishing between good and evil and the true and the false.

Some days ago, two children invaded the little garden in front of my house in London. I went out with the intention of chasing them from it, because I have learned by experience that such intruders usually come to pick flowers and pull up plants. But the elder of the two explained to me that they wished to get a good look at a blue butterfly that had just come in there, and I saw (Continued on page 386)

The Song of the Oaks

We are the oaks; to the firmament's brink
Comely in green we have climbed, that the sun
May warm the rude tides through our branches that run,
The blood of our health that we lustily drink
From the wide open sky.
Let the song of the oaks be your child's lullaby.

We have bled through the wounds that, in many a fight,
The mad winds have dealt us with enmity shrill,
But never could force us to bow to their will:
Our hearts are unshaken, our carriage upright;
We hold our heads high.
Let the song of the oaks be your child's lullaby.

We have loved, we have suffered: Oh! great Mother Earth
Whose prodigal womb is the source of our strength,
To whom must return all thy children at length,
In thy lap our ripe seeds, now awaiting rebirth,
Expectantly lie.
Let the song of the oaks be your child's lullaby.

We are old; the white winter a shimmering fleece
Of rime on our age-blackened branches has laid;
We are willing to live, but of death unafraid;
Our spirits are charged with the splendorous peace
Of an evening sky;
Let the song of the oaks be your child's lullaby.

Wildlife in Britain's Coldest Winter

By DAVID GUNSTON

The smaller, and most useful birds economically, suffered the most severely from the protracted freezing weather and the deep snows that affected the food supply of the birds for the longest consecutive period in ninety years. Such birds as the great tit shown at the right perished in large numbers, victims of the freak winter.

PHOTOGRAPH BY COLDSTREAM TUCKETT

THE EARLY part of 1947 saw Britain in the grip of the most prolonged cold spell for nearly ninety years, and among the many effects was the unprecedented impact upon her wildlife. Vast numbers of birds perished from cold and starvation, and there were many remarkable changes of habit and instances of quick adaptability among both birds and mammals. The chief result of the winter has been disastrous, especially where numbers of useful insect-eating birds are concerned, and the long-term results will not become apparent for some time.

There was little Britons could do about this widespread suffering, but it aroused deep interest among the general public, and, of course, the naturalists. Some of the more interesting instances are worth recording for the light they shed on the relatively little-explored problem of the relationship between wildlife and prevailing weather conditions.

What was the background against which this great battle with the cold was fought by all kinds of wild creatures? Britain usually has a temperate, insular climate, and is warmed by the flow of the Gulf Stream against her southwestern shores. The climate is mostly mild and nearly always wet, and, save for the extreme northerly and the highest points, severe changes in climate are rare. Thus, when a hard winter comes along, its impact is all the more felt by both human and wild inhabitants. We have bad winters now and again, but their severity generally lasts for quite short periods. This past winter the temperature drop was sudden and severe, and the freezing conditions lasted for a longer time than has been known before. At Kew, London, the standard meteorological recording station recorded the most constant low temperatures and complete lack of sunshine since such data began being taken there ninety years ago.

PHOTOGRAPH BY L. J. LANGFORD

Britain's whitethroat sparrow at its nest, photographed at a more happy time than the winter just passed.

Towards the last week in January the freeze set in and the snow began to deepen, and for the whole of February, and most of March, weather conditions grew steadily worse and more difficult. Britain lay beneath the buffeting of dense snowfalls, blizzards, gales, terrible frosts, freezing winds. Many places had temperatures at, or just beneath, the freezing point for weeks on end. Almost the whole of the country suffered equally—even the so-called Riviera coast of Cornwall in the southwest, where many inhabitants had never seen

PHOTOGRAPH BY L. J. LANGFORD

Among the insect eaters, skylarks, such as is pictured here, suffered grievously from the winter. Blackbirds, thrushes, robins, wrens, pipits, hedge sparrows and others died from hunger.

snow before, while parts of Ireland lay under their first deep snow of more than a century. With the thaw came fresh difficulties. Widespread floods came to many flat areas, some of which covered the equivalent of several counties and were several feet deep in places.

Such conditions were bound to have much effect on wildlife. Within two weeks of the first great cold it became obvious that wild creatures were finding life difficult in many ways, although even the most far-seeing did not anticipate the ultimate and heavy losses.

Severe cold means little, at first, to bird life, beyond a certain lessening of activity, but when it lasts long enough to influence seriously the availability of food supplies, its effects become increasingly noticeable. Under such conditions, there is, first, a great intensification of activity, a frenzied searching for food, but this slowly declines until death steps in and ends the struggle.

Britain is essentially a bird country. There are more than 300 native species, maintained by both summer and winter migrants from southern and northern lands, respectively. There is a much smaller number of mammals, some of which, like the hedgehog, the dormouse, the red squirrel and a number of bats, are complete or partial hibernators. So it was inevitable that birds, with their high volatility and body temperatures, whch must be maintained with constant supplies of energy-giving foods, should suffer most, and most conspicuously. Some of the mammals did die from various causes, and many changed their mode of life temporarily. The hibernators got through without any casualties; the complete hibernators, both mammals and reptiles, like newts, frogs, toads, lizards and small snakes, lay in suspended animation deep beneath the warm blanketing of snow, while the less complete sleepers, notably the squirrels, which often come out of their nests during mild spells in winter in normal years, tended towards more complete hibernation. A third category, which includes most of the smaller mammals—the voles, mice, shrews, rats, moles and the larger badger—which customarily lie low underground in cold weather without hibernating, did so more widely and continuously. Except where hunger drove them abroad, they got through pretty well.

But the birds could not hibernate or seek shelter. For them the eternal quest for food became a nightmare, and an increasingly fruitless one at that. The small and economically most useful birds had the highest casualties. Mostly insect-eaters, such species of familiar songbirds as blackbirds, thrushes, robins, wrens, larks, pipits, hedge sparrows and tits, could not get any food at all, and perished in vast numbers. Such losses are the hardest to bear, and farmers have been very worried about the effect upon this year's and subsequent crops from insect pests unchecked by thousands of these small birds. But of almost equal severity were the deaths of countless finches—little goldfinches, chaffinches, linnets and greenfinches—friends of farmers and gardeners for the toll they take of weed seeds in summer. These birds quickly exhausted the remaining thistle and other dead plant heads that stuck up out of the snow, and soon experienced starvation that was unique in our knowl-

edge. Of course, many hundreds of these small birds, as well as other less common species like nuthatches, bullfinches and tiny tree-creepers, were rescued from destruction by the kindly forethought of many householders in providing food scraps and water in urban and rural gardens. But even in a small, bird-loving country such as Britain, with its closely-linked towns and numerous suburban gardens, such efforts were bound to be limited against the overall loss of life that was going on over the whole countryside. This, to the dismay of Nature lovers generally, could not be stopped by human agencies.

Many and remarkable were the various turns of fortune for bird life. Some cases had a touch of irony about them, like the vast flocks of winter migrant thrushes we call redwings and fieldfares. These, arriving here as they do every year from Scandinavia and even farther north, to escape the semi-arctic cold and dearth of food, died wholesale in our fields. Redwings are notoriously delicate thrushes, and we often find them dead after heavy frosts, but the bigger gray fieldfares, regarded as much tougher, succumbed very sorely. Near my home on Britain's extreme southerly coastline, noted for its mild winter, where our visits from foreign fieldfares are something of an ornithological event if they appear in more than twos or threes, I saw huge flocks daily stripping berries from bushes and passing frantically on for more elsewhere. Not long after, I picked up many dead specimens on the snow. I also found dead great northern divers, oceanic travelers from farther south, which frequent our shores in winter, that had apparently succumbed when some of our estuarine beaches were partly frozen up. Waxwings, which occasionally visit us in winter—1946-47 was one of our periodical "waxwing winters" when they were more plentiful than usual—were also picked up dead from starvation and exposure, their stocks of berry-fruits left on the bushes from the previous summer having long since been exhausted by other species. There is a strong tendency among many of our birds to flock in winter, and although this may preserve individual species that stick together and share existing food, it soon results in the exhaustion of such food, and other flocks go short.

Many other species finally succumbed to cold and starvation. Green plovers, or lapwings, as we call them, one of the most useful birds to the agriculturist, died in large numbers. Woodpeckers died widely because the freezing winds iced up the crevices in the bark of their food trees, sealing off the minute insect life upon which they subsist, while ant life on the ground, their usual alternative diet, was equally unobtainable. Little owls, a day-flying alien species introduced here during the last century, suffered considerably, as the frost conditions precluded feeding on beetles and small mammals. Other owls and most predatory birds appeared to do quite well, finding daylight hunting easy, with many birds and mammals searching wearily for food and conspicuous against the dazzling white background of snow. Herons, our only members of the stork family, a species that has remained remarkably constant at some 4000 breeding pairs for many years past, were perhaps the most amazing of all the losses. Unable to fish in frozen waters, they sought small mammals like voles, and soft plant food, but these too were scarce, and many of the gaunt figures wasted away after long-drawn-out suffering. A case came to my notice of one of these usually wary herons that had taken up abode in a farmyard, feeding with cattle and horses, but it would not accept proffered food and eventually died.

The tameness of many creatures was remarkable. Hares and rabbits lost all fear of man, seeking such food as his habitation offered. Deer, our most shy mammals, became extremely tame, but in spite of valiant efforts to bring fodder to them, and to wild ponies on the moors, many perished through starvation or from freezing in deep drifts. In some places, where food was taken to starving cattle, rabbits and other animals jostled close at hand for mouthfuls, while in parts of Scotland wild birds did the same. Even owls waited outside houses for scraps.

We found it interesting to note what species of birds came through most easily. All our gulls, which for some years have become increasingly shore and inland birds, lasted without casualties, swarming in towns and gardens and getting the better of smaller or less rapacious birds when food was available. Cattle and sheep, already hard put to it through lack of food or shelter in the open, had to contend with savage attacks from herring gulls and, more especially, from members of the crow family, notably magpies and carrion crows, species that merely confirmed our knowledge of their extreme cunning and adaptability. The backs of cattle were fiercely pecked by their flocks, and young lambs (Continued on page 386)

Statement

By E. V. GRIFFITH

Oh, God, I hear You sometimes, when the trees
Toss wildly on the sagging sky, and roar.
I hear You sometimes when the harsh winds seize
The helpless branches; sometimes when they pour
Their secrets to a sky that shakes and tosses
Their boughs, and makes them writhe like things in pain.
Then winds enumerate the world's losses
And tell the forest Life gives little gain.

Oh, then I hear You, God—I hear You speak,
Quelling rebellion smouldering in the wood.
You reassure the trees that life is good,
That dreams mean strength; despair will make one weak.
And I, with clean, uplifted eyes that shine,
Have seen Your face; oh God, gaze down at mine.

The Balsa Tree

By ALEXANDER F. SKUTCH

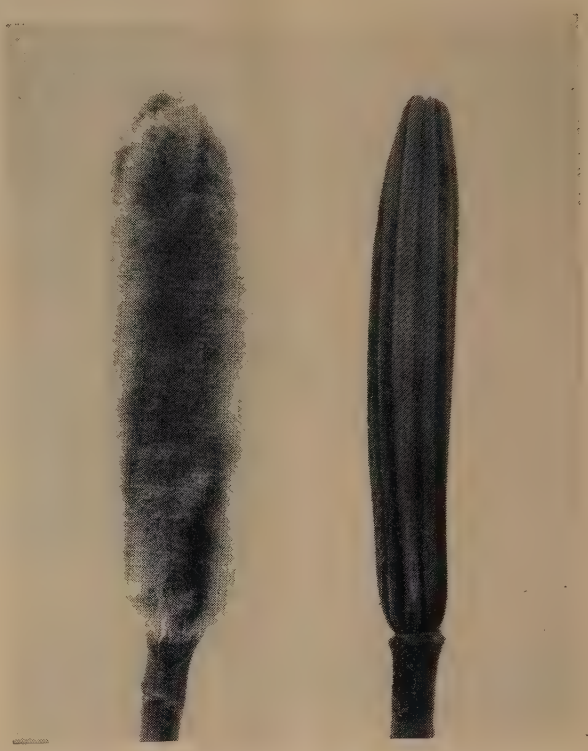
Photographs by the Author

THE BALSA is known far beyond its native home in tropical America as a tree that produces wood of extraordinary lightness, used for life-belts, for heat-insulation, for streamlining airplanes and making models, and for other purposes where strength is not of prime importance. Balsa wood varies considerably in its qualities according to its source. A cubic foot of dry wood of high grade weighs about seven pounds; this is roughly half the weight of cork, one-sixth the weight of oak or mahogany, one-tenth the weight of ebony. The same properties that make the wood light cause it to be a poor conductor of heat; its cells have thin walls and large cavities, which, when dry, are filled with air.

The balsa is a tree of pronounced character, and deserves to be known for a number of remarkable features in addition to the lightness of its wood. It belongs to the genus *Ochroma*, of the Bombacaceae or cotton tree family, and is confined to the Tropics of the Western Hemisphere. Authorities are not in agreement as to the number of species, which are at best difficult to distinguish. Balsa trees do not grow in the heavy primeval forest, but spring up in newly made clearings and along the shores of rivers and lagoons, where they enjoy an abundance of sunlight.

A balsa tree growing on the bank of a lagoon in Panama, showing a form that it often assumes when growing in the open. Below, left, is the flower of the balsa tree. Directly below is a picture of the stamen tube of the balsa, showing the stamens closely crowded together and bent in curious patterns. The spirally twisted stigmas protrude from the end of the stamen tube.

They require also plenty of water and a warm climate, hence are confined to the rainier parts of the Tropics and to low elevations. In Costa Rica the highest examples are found almost 3000 feet above sea-level. The growth of the tree is remarkably rapid, and in comparatively few years it attains full growth, when, under the most favorable conditions of soil and climate, it may have a height of from seventy-five to one-hundred feet, with the trunk two or three feet in diameter at breast height. When growing in close stands the trunk is tall and straight, but in the open it is less regular in form and the spreading crown is sparsely branched. The smooth, lichen-encrusted bark is attractively mottled with shades of gray and brown. It contains a strong fiber sometimes used for cordage; as with a number of other trees with soft, weak wood, the fibers in the bark are probably of considerable importance in the mechanical support of trunk and branches. The ample leaves vary from pentagonal to somewhat heart-shaped in outline; the stalk is long and the blade may reach a foot in length, or, in young saplings, much more.



The pod of the balsa, entire (right), and with the soft down escaping between the valves (left).

The flowers of the balsa, which open chiefly at the beginning of the dry season, attract attention by their large size and strange form. They vary from four to six inches in length. The long calyx-tube is thick and fleshy and divides into five lobes at its apex. The thick white petals, also five in number, are arranged in the curious form that botanists call convolute, each having one of its edges outside the neighboring petal on one side and the opposite edge inside the adjoining petal on the other side. Most remarkable are the stamens, which are numerous, united into a tube that surrounds the style, and all strangely doubled and bent into an intricate, close-fitting pattern. The stigmas are twisted together in spiral form. The upright cup of the balsa flower gathers rainwater, which birds and monkeys sometimes drink.

The flower is followed by a long, slender, prismatic capsule, filled with light brown cotton in which numerous small seeds are imbedded. Upon drying, the pod splits into five long, slender valves and the resilient down wells out between them, forming a great fluffy mass. This down makes the softest of pillows, but it is highly compressible and to gather enough to fill the pillow is a time-consuming occupation. Balsa down retains its resiliency for indefinite periods. Once I opened a box in which a pod had been stored away for many years. When the lid was removed the imprisoned cotton began to spring out of the pod and continued until the mass had grown to several times its original volume.

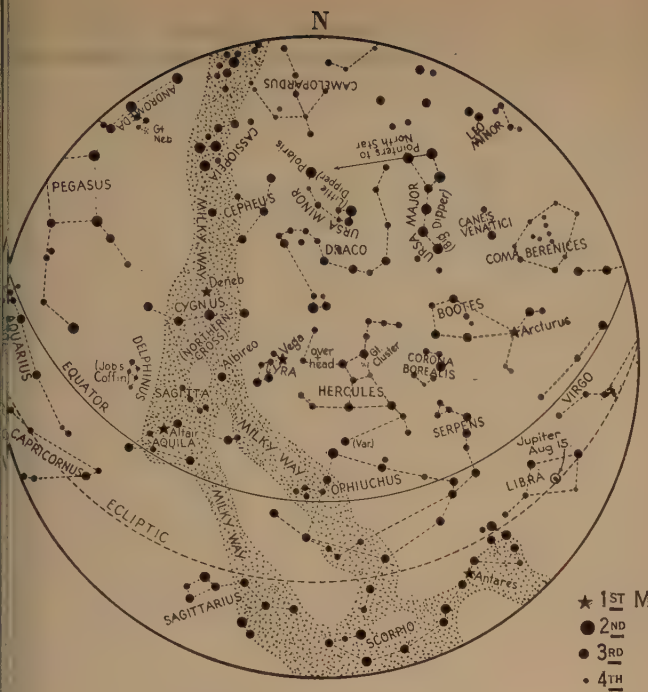
The word "balsa" is Spanish for raft and was applied to the tree because it is so often used for making rafts. The deep, light alluvial soils along the Rio Esmeraldas in northwestern Ecuador are most favorable for the growth of the balsa tree. While voyaging up this beautiful river some years ago, we passed many rafts of balsa logs floating down toward the sea. They were steered after a fashion by a crude rudder that was merely a broad paddle affixed to the end of a long, stout pole attached at the stern; by much hard pulling on the pole, the helmsman obtained a sluggish response from the heavy, clumsy craft. Sometimes the raft was provided with a little canopy of palm leaves beneath which the occupants took shelter from sun and rain. As they shot down the rapids in the upper river, the rafts danced and shook so violently that they appeared to be in danger of falling to pieces. The cargo was composed of big black balls of crude castilla rubber; tagua or "vegetable ivory," the seed of a palm tree; bananas and other produce. After delivering his cargo at the port of Esmeraldas, the boatman would sell his raft of peeled balsa logs to one of the sawmills near the town. The proceeds would more than cover the expenses of his journey.

Earthshine

By MARGARET S. HOSMER

In the dim east I saw the curved moon rise,
Laboring up the skies
With the burden of earth's shadow
Carried cradle-wise.

At twilight now she's slipping down the west,
Wearily to vest
Her shadow-burden in the darkening hills
Of coming night, and rest.



9 P.M., Aug. 1; 8 P.M., Aug. 15.

★ 1ST MAGNITUDE
● 2ND "
● 3RD "
• 4TH "
• 5TH "

9 P.M., Sept. 1; 8 P.M., Sept. 15; 7 P.M., Sept. 30.

To use these maps hold them before you in a vertical position and turn until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

August-September Skies

By ISABEL M. LEWIS

DURING these two months, Arcturus in the kite-shaped constellation of Bootes will be the most brilliant star visible in the western sky. It will be easily recognized by its distinctive orange color and its position at the base of the kite. Nearest to it, of the stars of first magnitude, is the white star Spica, in Virgo. This star sets in the southwest in the early evening in August, and disappears in the rays of the setting sun in September. Red Antares, in Scorpio, in the southern sky, will also disappear from view in the evening sunset before the end of this period.

Brilliant blue-white Vega, in Lyra, is equal in brightness to Arcturus but conspicuously contrasts with it in color. It lies far to the east of Arcturus. The two constellations of Corona Borealis and Hercules lie between them. Hercules, although of enormous size, contains no star brighter than Alpa Hercules, which is of second magnitude, but has a number of third magnitude stars. Corona consists of a beautiful little circlet of stars in which the gem in the crown is the second magnitude star, Alphecca. It lies directly east of Bootes. Lyra is also one of the small constellations, about equal in size to Corona. Lyra lies directly to the west of the Northern Cross in Cygnus. Deneb, at the head of the Cross, and Altair, in Aquila, south of Lyra and Cygnus, are stars of first magnitude. With Vega, they will be in the eastern half of the sky during this period. In latitude 40 degrees north Vega passes directly overhead when it transits the meridian.

The planet Mercury will be in the morning sky until August 28, when it will be in superior conjunction with the sun and will then pass to the evening sky. Mercury should be easily seen in the eastern sky shortly before sunrise for the first ten days or so in August. It will be at greatest western elongation on August 3. It lies at that time a few degrees south, or southeast, of Castor and Pollux in Gemini. Mercury increases rapidly in brightness following the date of its elongation, when it is about equal to Vega in brightness. On August 14 it is as brilliant as Canopus, and on August 24 it is almost exactly equal to Sirius in brilliance. By that time, however, it is too close to the sun to be seen. After superior conjunction, Mercury will be very low in the west and will not be visible for the remainder of this two months period.

Venus will be in the morning sky until the date of its superior conjunction with the sun on September 3. It will be too close to the sun before this date to be more than glimpsed near the eastern horizon in the morning twilight early in August. It will be

too poorly placed in the western sky to be seen in September. Venus will be in conjunction with Saturn on August 12, the moon on August 15, and Mercury on August 26, but all these bodies are too close to the sun at the time to be visible.

The planet Mars is now on the far side of its orbit from the earth, and it will not be in opposition to the sun this year. Its distance from the earth will decrease from about 184,000,000 miles on August 1 to about 154,000,000 miles on October 1. During this period it will pass from a point about midway between the horns of Taurus, on August 1, through Gemini, south of Castor and Pollux, into Cancer. Its brightness during this period will remain about equal to that of a star of one and one-half magnitude, or a little fainter than Pollux. Mars is easily recognizable by its reddish color, and will rise several hours before the sun during this period and will be conspicuously in view in the morning sky shortly before sunrise. There will be an interesting conjunction of Mars with Uranus on August 5. Mars will then be only one minute of arc north of Uranus, and the eye would not be able to separate the two bodies without optical aid. The early morning of August 6 is the best time to observe this phenomenon, and one should use binoculars as Uranus is at the limit of visibility for the naked eye. Although the conjunction of the two planets occurs on August 5, at 9:00 P.M. E.S.T., when they are below the horizon in the United States, their relative positions will change very little in the few hours that will pass before the planets come into view above the eastern horizon. This is one of the few opportunities that one may have to identify the planet Uranus by means of its close angular approach to a bright planet.

Jupiter is the only planet that will be seen in the evening sky during these two months. It will be on the meridian due south at sunset on August 12, and in the western evening sky for the remainder of this period. By the end of September it will be low in the southwest at sunset. It will be found in the constellation of Libra. Jupiter is one of the most interesting planets to observe in the telescope, not only because of its constantly changing surface markings with their varied colors, but, also, because of the interesting phenomena of the four brightest satellites. The surface temperature of the planet has been found by measurements to be as low as minus 200 degrees Fahrenheit, and its atmosphere consists very largely of ammonia and marsh-gas. Next to Venus, Jupiter is the most brilliant of all the planets and it will be easily recognized by its deep yellow color. The nearest to it of the first magnitude stars during these two months will be Spica, which is to the west of it, and will disappear before it in the rays of the setting sun, and Antares in Scorpio, lying to the east of it and, in color, noticeably reddish.

Saturn is now between Cancer and Leo, about 20 degrees east of Mars and a few degrees west of Regulus. It is pale yellow and surpasses both Mars and Regulus in brightness. It will not be visible until the latter part of August as it is in conjunction with the sun on August 5. In September Saturn will rise north of east about two hours before the sun. There will be a conjunction of Venus with Saturn on August 12, and of Mercury with Saturn on August 18. The planets will then be low in the eastern sky before sunrise.

One should remember this month to watch for the Perseids, the meteor shower that returns annually in August and has its maximum display in the early hours of August 12. The members of this swarm, which receive their name from the fact that their radiant lies in the constellation of Perseus, are widely scattered along their orbit. For that reason they may be observed in considerable numbers for a number of days before and after the date of maximum display. As the earth meets the swarm "head on", they are rapidly moving and leave short brilliant trails, bluish in color. The Perseids are the most consistently appearing of all the meteor swarms and may be counted upon to give a display each year.

On September 23, at 4:29 P.M., Eastern Standard Time, the sun will cross the equator going south. Autumn will then commence in the northern hemisphere and summer in the southern hemisphere.

Summer Night's Spell

By ELAINE V. EMANS

Over my garden Scorpio,
With ruby-red Antares, hangs
Complete with curving tail and fangs
And giant pincers. And although
He stung Orion in the heel,
'Tis said, and though the very sight
Of him inspires awe, I feel
A camaraderie to-night
Between us, and, if he should stoop—
Who knows—perhaps I'd hand him warm
Insects, and laugh to see him scoop
Them greedily with a starry arm!

Evening

By C. M. RIDDLE

Black chimney swifts at play
Are nailing up the shutters of the day.
Hurling themselves like hammer heads,
They strike the golden stars,
Scattered like thumb-tacks
Across the sunset bars.

Camera Trails

By EDNA HOFFMAN EVANS

EVERYONE, as soon as he (or she) gets old enough, has a collection of memories stored away in whichever part of the brain it is that takes care of such things. Some of those memories represent high spots—times, places and persons that can be remembered and re-enjoyed with pleasure. Others represent low spots—and the less said about them, the better.

But as time rolls along and the distance between "now" and "then" grows greater, the high spots get higher, while the low spots are apt to level off so that, viewed from an ever-increasing distance, they do not appear quite so low, after all.

Looking back through our file of photographic memories, it is not hard to pick out high spots and low spots. One low spot, which seemed to hit absolute rock bottom at the time, occurred when a whole pack of newly exposed white ibis film dropped into the water and was ruined just as we were unloading our boat after a long day of bird stalking. At the time the accident seemed catastrophic. Now, it just seems "too bad."

On the other hand, a photographic trip to grim old Fort Jefferson and the Dry Tortugas continues to stand out as a distinct high spot, so far as picture-taking is concerned. And time, in moving onward, has smoothed away memories of discomforts—the heat, mosquitoes, foul water, gigantic scorpions on the walls and floor after dark, sunburn, glare, thirst, and other assorted inconveniences.

The Dry Tortugas are unique, and, to us, they offered an outlet for several different hobbies.

In the first place, they are tiny, isolated bits of sand and coral, some seventy-five miles west of Key West, Florida. The choppy stretch of Rebecca Channel and the Florida Straits cut them off from the keys and the mainland. There is no traffic congestion on the Tortugas—few people ever hear of them and fewer, still, visit them. We do not like crowds.

Second, they tickled our flair for history. Early Spanish explorers named the group *Tortuga,* from the great number of sea turtles that deposited their eggs along the sandy shores. Pirates infested them in the bad old days of the buccaneers. Then, about a century ago, military planners noted their strategic location at the mouth of the Gulf and considered them the first line of defense for the port of New Orleans.

Arch after arch stretches away in the distance along the old corridors of Fort Jefferson. Each opening was originally designed as a gun emplacement—but many of the guns were never mounted. Millions of red New England brick went into the fortress.

The main entrance to Fort Jefferson and the moat, originally spanned by a drawbridge. Dr. Mudd ordered the gunports in the second level broken out during the yellow fever epidemic.

It was with this end in view that Fort Jefferson was built on Garden Key—a gigantic (for those times) six-sided structure of red New England brick. Scores of masons labored for years to build the maze of walls and arches, of frowning gunports and broad, sundrenched terreplein. While it was outmoded by the march of military progress even before it was completed, Fort Jefferson played a minor part in several wars.

A Union garrison held it during the Civil War. Later it was known as the "American Devil's Island," and Dr. Samuel Mudd, the Maryland physician who set John Wilkes Booth's broken leg after the assassination of President Lincoln, was its most famous prisoner. There Dr. Mudd battled the deadly "Yellow Jack" in the days when yellow fever was thought to stem from the mists that rose from swamps. There one can still see the holes knocked from around the gunports, at the order of the redoubtable captive, to "let the miasma out."

In the Spanish-American War, Fort Jefferson served as a coaling station for naval forces and, again, in the recent war, it played a part (hush-hush, of course) in our coastal defenses.

But it was to the photographer in us that the Tortugas made their greatest appeal. There were the fort's long corridors—arch after arch stretching away in the distance to satisfy our feeling for perspective. There were hoary walls, battered by years and breached by forgotten hurricanes. There were the massive, antiquated guns, the deserted parade ground—bare bones of history bleaching in the sun.

There were billowy, ever-changing backdrops of clouds, stretches of blue sky, limitless horizons, and silver-crested expanses of water. There were brilliant-hued tropical fish, long-spined black sea urchins, purple sea fans, countless sea shells—some of them housing red- and purple-legged hermit crabs. There were coral heads and antlers, water-worn bits of driftwood, flotsam and jetsam that might have come from the four corners of the world, and probably did.

But overshadowing all these were the birds, countless thousands of them, that have bred on the Tortugas throughout all the years that humans have taken cognizance of them.

Two species of terns, the sooties and the noddies, have selected Bird Key in the Tortugas group as one of the few places in the United States where they care to breed in great numbers. Some few other sea birds may nest there, too, but the terns far outnumber these. "Bird Key" itself is an impermanent place. Since the islets are only a few inches above the high tide mark at best, storms move them about easily. The "Bird Key" of today is an entirely different place than was the "Bird Key" of a generation ago. One was built up and the other washed away by storms and wave action.

The low, scraggly vegetation cannot provide housing facili-

(Continued on page 385)

The School Page

By E. LAURENCE PALMER

Professor of Nature and Science Education, Cornell University, and Director of Nature Education, The American Nature Association

THE WHIRLWIND

One of the pleasures about writing this page comes from the correspondence it has stimulated. Readers write that they have read the page for years, enjoy it but differ with the viewpoint, now and then. Perhaps this immediate page will stimulate some more of these welcome comments. I subscribed to *Colliers* for years, largely because I differed with some of the philosophy I found there, and fighting the philosophy of a great magazine like *Colliers* takes off some of the surplus energy you might use in differing with your friends near at hand. Growth takes place where differences exist.

When I was in high school, from 1903 to 1907, I took three years of Latin, two of French, four of English, one of biology, a most pleasing one in physics, and a half year of chemistry, among other things. When I taught my first year in botany in high school in Iowa, in 1913, I attended a state teachers' association meeting. There, for the first time, I heard of general science. I heard it praised from the lips of an author of one of the early general science books, an author whose books on botany I had long admired greatly. We were told that if we would follow this new banner everything would be fine. We would stimulate enrollment in advanced classes in science in high school, we would get the scientific attitude more generally appreciated, we would increase the laboratory experience of more students at the high school level and we would keep our high school population in school longer. I admit that we have attained some of these desirable objectives, but I doubt if the introduction of general science as a substitute for good courses in biology, physics, or chemistry has been the factor, and I am reasonably sure that so far as some factors are concerned we are worse off than we were forty years ago. I hold the private conviction that, in some of these cases, general science adoption has been *the* factor. Now, let the lions roar.

If I remember correctly, when I first heard of general science I was sitting beside Dr. Robert Wylie, who later became head of the botany department of the University of Iowa. At the time, I was in charge of the work in botany at the Iowa State Teachers College. We discussed the general science idea, which was relatively new to us, pro and con, and came to a conclusion that, to me at least, has been more or less satisfactory ever since, although I am sure I have been willing to be convinced to the contrary. I am not sure that a general science course could not do what we had been told it could do, but I am rather sure that general science has not lived up to the promises its leaders have made through the years.

I remember that discussion with Dr. Wylie. We both agreed as to the desirability of reasonable understanding of the teaching of physics, earth science, chemistry, botany and zoology, but we did not see how a well-rounded course in botany could avoid giving just that training. We admitted that similar courses, bearing on many sciences, could well be taught as physics, as chemistry, or as zoology, or with these sciences as the core. We did not see how one could teach about photosynthesis, by the laboratory method, without some understanding of chemistry. We did not see how in the world one could study pollination of plants without some ability to recognize some of our common insects and to know their function in the world. Certainly we did not see how one could give a rational understanding of transpiration, of capillarity and of the relations of plants to soils without a functional understanding of much that we had learned in courses in physics. Today I am certain that students can turn in splendid workbooks in general science and still have little or no understanding of those things we were teaching every day in our botany laboratories, indoors and out.

I have no intention of assuming that any course in botany is necessarily better than the best course in general science. Only yesterday I heard of a one-term course in botany given in a teacher-training institution to students who would have no more science in their training period. The teacher boasted that he had had 150 hours of college botany, and that none of it was in taxonomy or in field natural history. He had specialized in histology, cytology and the anatomy of plants, although he could not recognize a maple when he saw one. In fact, he insisted that his students draw their maple twigs with the leaves alternate rather than opposite because the drawings were more confused when the leaves were placed opposite each other. No, we do not want that kind of botany as a substitute for general science, but I rather think we would make better progress towards the objectives originally stated by the defenders of general science if we did away with some of our workbooks, with many of our textbooks, and got down to some real first-hand laboratory experience in some science presented with its broader implications.

When I first heard of general science, the subject matter was presented in a little book not much more than a half-inch in thickness. Then along came rival books with new angles on the subject, and newer books with still new angles and more pages. Then along came the defenders of demonstration by the teacher as against individual laboratory experience. And now we are reaping the whirlwind caused by the wind sown by these pseudo leaders.

I admit that, in order to teach what our general science teachers are asked to teach in a year, about the only technique is to follow the book. The New York State outline that was in force for many years was prepared by the authors of a well-known general science series. Naturally they made the outline such that, to cover the ground, you had to use a book, and preferably their book, in the sale of which they had a personal interest. One could hardly cover all the points raised in that state outline by teaching a good course in any one field of science as a substitute for a rat-race through all of the sciences. But I wonder just what the function of a high school science course is when I try to analyze that situation.

I know that some will resent the viewpoint taken here, and will say that there are more students taking high school science now than formerly. One of my closest friends and associates some years ago took me to task on that point, and showed me figures indicating larger numbers of students taking science at the high school level. What he had failed to note was that the high school enrollment during the same period had increased vastly, and the percentage of students taking science had dropped in proportion to the enrollment. Further, he had failed to note that the big enrollment had been in the first year in which general science had been required, while the enrollment in the special sciences, or in any advanced science, for that matter, had dropped off tremendously. I do not see how the record shows us that the introduction of this new approach to science has stimulated interest in science by high school students, or recruited adequate enrollment in advanced work in science at the high school level. I devoutly hope that I am wrong in this assumption, and that someone will point out the weaknesses in my conclusion. If they will give me a sound refutation I will gladly see that it is published on this page, so if you are mad about what you have read so far let us hear

July

By VANESSA GEYER

The sky's a huckleberry-blue
Meringued with blobs of white;
I sometimes look at it and think
I'd like to take a bite
And see if it's as ice-box cool
As it looks to mortal sight.

your views, supported by facts.

While I took a year of biology in high school, as well as courses of the laboratory type in physics and in chemistry, my son has been busily filling a workbook with answers he got from a lecture or from a textbook. He is an excellent amateur ornithologist, but he does not like high school science. He could go through the high school course in New York, now, with only a year of science, plus a course in health. I believe he could go through the whole four years and never once set up and carry through a laboratory experiment such as Wylie and I were requiring of our students in botany when we first heard of general science more than forty years ago.

I rather think that this situation is not academic. I am sure that we are to live in a world of the future in which an understanding of science and the scientific method is to be of survival importance. I cannot see that reducing the science required of high school graduates is preparing us for the future we must face. I do not feel that general science has lived up to its promises, although I would be the last to say that it could not do so if we threw out some of the workbooks and cut down most of the windy lectures and reduced the size of our texts. We have sown the wind and are still sowing it. I fear we will reap the whirlwind.

Poems of Nature

Born to the Land. By Irene Stanley. Published by the Author, 4627¾ St. Charles Place, Los Angeles 6, California. $1.50.

The happy choice of the title for this collection of poems reflects the thread of thought that runs through these verses. We gather that the poetess grew up close to the land, living her younger days in a homestead home. There is, therefore, a deep and sincere oneness with the land in these poems; an appreciation of Nature that lies deeply within their author.

William Bartram's Travels

The Travels of William Bartram. Edited by Mark Van Doren. New York. 1947. Dover Publications. 414 pages. $3.75.

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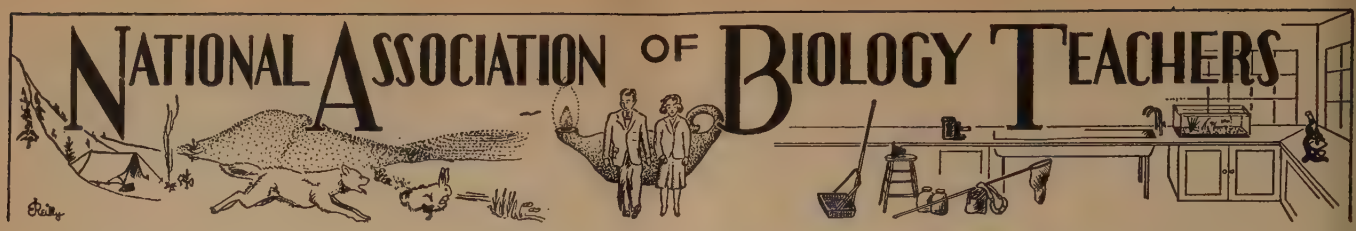

BEHAVIOR OF PLANTS, ANIMALS, AND MAN

By Howard H. Michaud

BIOLOGICAL behavior will be the theme of the program of the National Association of Biology Teachers meeting in Chicago, December 30, as a part of the annual convention of the American Association for the Advancement of Science. The biology teachers will meet jointly with the American Nature Study Society.

Biologists are interested in a study of behavior because of its relation to human activity. Whether the knowledge of earthworm behavior has any kinship to that of man may be debated. That man as a worm would find life less complex is not questioned. At any rate, the worm's problems do not involve the highly specialized services of the doctor, lawyer, politician, sociologist, and psychiatrist.

Living protoplasm is sensitive to external environmental stimuli. The most primitive animals, the protozoans, react to their surroundings without the benefit of specialized nervous systems. Insects, on the other hand, have well-developed senses and a relatively simple brain. Even without much brain, the actions of insects are well ordered. Their reactions are mostly beneficial, although their response to light or sticky flypaper may be fatal. But man, with all his power of reasoning, has contrived machines that are as deadly as the insect's flight into a burning candle.

Insects, from a human view, display some behavior that would indicate ability to think and reason. However, this is not possible. The tumble-bug fashions a small ball of cow manure, from which the larva may feed, and buries it, having laid an egg within. Some species of ants not only feed from the secretions exuding from the abdomens of aphids, but harbor the insects in winter in their underground tunnels. In the spring, the aphids are returned to their plant pasture, so to speak, as man returns his cattle to the fields. These are examples of instinctive behavior.

Birds and mammals offer many examples of instinctive behavior. In the reproductive cycle there is a long chain of actions that impel the bird to mate, select a nesting site, build a nest, lay eggs, incubate them, feed the young, and continue to care for them after they have left the nest. The cowbird by laying its eggs in other birds' nests takes advantage of this instinct. Thus both eggs and young are given the care of foster parents.

The animal mind largely directs the welfare of the species. Survival depends upon obtaining food, cover, water, and attention to the reproductive cycle. The ability of animals to adapt themselves to the changing environment often spells success or doom for the species. The ruffed grouse, prairie chicken, and ivory-billed woodpecker are so closely associated with a specific environment that they cannot survive drastic changes. Plowing the prairie grasses to plant corn has played its part in depopulating the prairie chicken. Forest depletion has helped in the reduction of the ruffed grouse and the ivory-bill.

Successional stages in vegetation may fail to provide the suitable kinds of plant growth forms for animals when the succession changes. Instinct, undoubtedly, plays an important part in establishing certain animal populations, especially when the behavior indicates a definite dependency upon characteristic shape, size, and physical structure of vegetation. This knowledge shows the value of determining the needs of wildlife in relation to its environment if a successful program of conservation is to be effected.

The Chicago meeting next December will include contributions from psychology, psychiatry, medicine, genetics, and sociology. These fields reflect some of the complexities of human living in a modern world, and the biologist is interested in their relationship.

Man's problems of survival, in a primitive sense, are the same as for any other animal. Food, shelter, clothing, and the reproductive process are physical and biological necessities. Tools, literature, art, religion, and science are products of a highly specialized civilization. They result from the evolutionary process of thinking, reasoning and schooling.

Modern man relies upon the advantages of the machines of human invention. With less work demanded of him, he seeks an outlet elsewhere, as in institutions, ideologies, philosophies, and the creative arts. He substitutes primitive mechanical behavior for mental effort that leads toward the boundless confusion of battling against Nature and the universe. In leisure, as in work, man is no longer content with his own entertainment. The automobile carries him to endless programs, athletic contests, and the cinema. The radio, magazine, and newspaper keep reminding him of earth's man-made turmoil. The modern human tries to outdistance time, and runs away from the healing solitude that Nature intends.

What can man learn from Nature and her patient ways? First, he should so live that he will be in harmony with Nature. Man's habits in conflict with natural laws are responsible for depletion of our natural resources. They give rise to our stomach ulcers, heart disease, divorce, crime, and an increasing number of mental cases to which the doctors, courts, and psychiatrists fall heir. They contribute to the despoliation of the American landscape, producing our city dumps, polluted streams, slums, degraded highways, and cluttered picnic areas.

Also, there are many lessons to be learned from the lower animals. While they are not endowed with the mental acumen of the human, there is an advantage displayed by animals that rely on instinct alone. Witness the wrecked web of the spider. Is the spider frustrated? No; Nature has fixed a pattern of patient behavior. The spider merely begins again and builds another web.

That the psychiatrist gained his information from the spider is not likely. But, a mentally disorganized human patient may be recalled to an early age of experience, to begin again, to spin a web of confidence in life for the future. If our habits could be rebuilt from the simple acts of the spider, or the butterfly, it would well pay to take time for a trip to the country.

For those who derive simple pleasures from inexpensive walks into the woods, a camping trip along quiet water, or the solemn magnitude of mountain majesty, there is a sobriety of influence that adds to the human soul. Thoreau, Emerson, and Muir were able to view Nature with a deep-seated purpose. Their habits seemed odd to some others, yet they experienced contentment rather than conflict.

Remember that man is endowed with highly perceptive senses. What is most important is that his response to the environment, conditioned by the best developed brain on earth, should be conducive to the happiest kind of living. Not to derive the greatest benefit with the best of equipment is to miss one of the greatest gifts of Nature.

Birds everywhere, on the ground and in the air, coming and going endlessly. This is the scene that greets a photographer when he sets foot on Bird Key in the Dry Tortugas.

ies for all the birds. Fortunately, the ern cousins favor different fashions in ests. Sooty terns are content to lay their ggs on the bare sand, with only the lightest of hollows to serve as a "nest." Noddy terns, on the other hand, build nore elaborate structures of sticks on he bush-tops, laying single eggs.

While the Tortugas rookery has, in he past, been preyed upon by feather unters and egg collectors, the present enerations of birds are protected. Thus, hey have no fear of human beings and he noddies, especially, will permit pho-ographers to approach within close-up picture range without leaving their nests.

Probably it was this willingness of he birds to pose that endeared them to s. Every bird photographer knows how disheartening it is to have his good in-entions misunderstood. Thus, to have bird mothers wait fearlessly with their fuzzy white nestlings was, for us, a rare and heart-warming experience.

Never, during the days and nights we spent on the Tortugas, did the inhabitants of Bird Key cease their activities. By day the air was filled with wings. By night a shrill, continuous chorus of bird noises indicated that the terns were still coming and going. Perhaps this is why they are sometimes known as "Wide-Awakes." Judging from the noise, none of them gets a chance to sleep.

With the willing cooperation of so many bird models, there were few problems facing the photographer. It was possible to experiment with exposures and filters, to stop the lens far down without fear of having to shoot fast. Only in flight pictures was speed necessary,

(Continued on page 388)

Noddy tern mothers, their gray heads shining like aluminum in the sunlight, will remain on their nests and allow photographers to approach within close-up picture range. This fuzzy white baby did not even bother to face the camera.

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IN THE BEECHWOODS

(Continued from page 351)

does not dart off in instant flight. It clings to the leaf, and in the glare of our lamps, rolls away from the disturbing finger or twig. If we merely continue to illuminate it, the fly slowly wakens and begins to clean itself. It takes time for the insect to organize its activities for a new and strangely early day.

A shining trace marks the path of the land snail. From its sleeping spot on the alder leaf a wet and sticky trail leads up the stem to another leaf. There the extended animal glides along, eating holes in the foliage as it goes. We can hear the faint crunch of fresh vegetation as jaws rasp into it, and through the pebbled skin of the snail's back we watch fragments of green pass backward in the animal's gullet, like cars along a one-way street.

From the gray trunk of a tree yards ahead, we can see a golden-reddish gleam. On closer inspection the sparkle becomes double. It shines from the eyes of a moth. Like the bright buttons that mark the highway at night, reflecting the headlight beams of each passing car, the moth's eyes turn back to us the light from our flashlamps. The insect has become adapted to the dark by withdrawing pigments in its eyes to expose a reflecting layer. Light entering its eyes is reflected around inside rather than absorbed and lost. Thus the animal gains an extra opportunity to see at low intensities. The shining eyes of a cat at night demonstrate this same provision. If we turn off our flashlight, the gleam vanishes and the woods are really dark. With a flick of a switch we flood the moth with brilliance and its eyes glow back at us like living embers.

Down the path a scintillating speck of light approaches us. It moves in little rushes with pauses between. We go to investigate and find that the eyes that reflect our flashlight this time are those of a spider. We recognize a daytime acquaintance, the wolf spider, a solitary creature with a dark stripe down its back. It is still roaming the woods in search of insects on which to pounce. But our minds have leaped across the continent to the deserts of Arizona and southern California, where we have come upon spiders with reflecting eyes. As you drive along back roads at night there, your headlights are picked up and shone back at you in tiny glittering eyes of trapdoor spiders, whose lidded hide-outs line the unpaved trails.

In autumn the beechwoods are full of katydids, and a flashlight field trip finds the long-horned green grasshoppers fiddling away with a wide variety of calls. We gain a purely emotional pleasure in watching these animals, in satisfying our curiosity about life habits, and in experimenting with their reactions to such small changes in their environment as we can produce without disturbing the creatures and putting them to flight.

While walking through the beechwoods, or sitting quietly by the stream, we are invariably impressed with the abundance of life around us. Every cranny, each inch of leaf or loam is inhabited by a variety of active creatures. Even in winter the woods are not empty. Nor does the blazing sun of summer roast all the life from western deserts. Sulphurous hot springs have their blue green algae and various resistant kinds of insect young. Nature is full of niches. But wherever the niche lies, and however it is limited by time of day or season, by temperature, humidity or drainage, some animals and plants have found ways to live there. The niche may be as broad as the Arctic tundra, extending around the North Pole and tipping mountain peaks above the timber line. It may be as restricted as the water in leaves of certain pitcher plants, found only in association with peat moss in bogs. Yet wherever man has pushed to see what lies ahead, be it snowcaps of Mount Everest or ice floes in the Antarctic, there are spiders catching insects. In the depths of the ocean and in the farthest reaches of natural caves in the earth, there are animals and seemingly simple plants that depend ultimately on sun energy transformed and brought to them by gravity, by water currents or by other animals.

The spaces below the bark of a fallen giant beach may be heated in the sunshine to as high a temperature as the surface sands of the desert. But in both places some animals and plants can thrive. Many of these seeming miracles are no farther away than the vacant lot next door, the pond in the park, or the summer resort at which you plan to spend your vacation. Watching for them is an interesting way to add to outdoor enjoyment. And, little by little, scattered observations knit themselves into a clear view of the activities of each creature. Together they become a veritable animal harvest. As Gilbert White so well and wisely said: ". . . all nature is so full, that that district produces the greatest variety which is the most examined."

SPEAK TO THE EARTH

(Continued from page 373)

that, in truth, there was in the garden a rare blue butterfly. We studied it together, and the little one remarked that he had recently seen in a neighboring park a butterfly of the species called "Red Admiral." "So you are interested in butterflies, then?" I said. And he explained to me that on account of the falling bombs he and his brother had been evacuated to the country. There they had soon met with a schoolmaster with imagination and sympathy, who interested them in studying Nature in the open countryside. "When we left London," added the little one, who was perhaps about ten years old, "it made me very sad, but afterwards I had no desire to come back here." I judged that it was these Nature studies that caused these two children to be different from the young apaches who ordinarily broke into our garden. While we were talking, I was reminded of the old Breton song, "The Song of the Oaks," printed on page 373 of this issue.

Can one find in this, and in the fine English translation made by Anatole Le Braz, the idea of Job, the idea of the *Koran*, that of Vivienne De Watteville and that of Sir James Barrett? Inspire in children a taste for, and an understanding of, Nature, and especially the understanding of its continuity in spite of all vicissitudes, and they will learn to know themselves. Let them "speak to the earth," and if it is not already too late, in following this path they will be able to say, one day, as will their successors after them in a world at last peaceful:

"Of the august peace which fills the evening skies
Our spirits are full."

WILDLIFE IN BRITAIN'S COLDEST WINTER

(Continued from page 376)

had their eyes pecked out. Numbers of cattle and sheep were actually killed by these birds, while a lady in Gloucestershire was viciously attacked by a hunger-maddened crow. Even the otherwise peaceful mute swans turned savage, and a flock of twelve attacked the crew of a lightship who were preparing to throw them food. There were large-scale drifts towards the coast, and also into towns and gardens, by many birds not usually encountered there. The timid species perished, but the more intelligent and resourceful ones fought the weather with success.

It is still too early to judge what the final results upon our wildlife populations will be. Our losses have been grievous, but doubtless they will be righted by Nature within a few years. But for every reason, and not least the results imposed on our wild creatures we do not hope to see such weather again.

ANSWERS TO SNAKE QUIZ

1—Bull snake
2—Coral snake
3—Garter snake
4—Gopher snake
5—Green snake
6—King snake
7—Lyre snake
8—Milk snake
9—Moccasin
10—Rattler

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3. *Who may advertise:* This department is an open market trading post. Any individual or firm whose advertisement and methods of doing business meet our requirements may advertise their goods or services.

4. *Rates:* All classified advertisements must be accompanied by remittance. The rate is 15c per word including name and address—minimum charge $2.00. Cash with order.

5. *How to count numerals, etc.:* Groups of figures are counted as one word. Abbreviations consisting of initials or single characters likewise are counted as one word. Hyphenated words are counted as two words.

6. *"For Sale" ads must state prices:* A specific price must be stated on all FOR SALE ads —except that the phrase "write for catalog" may be used when listing real estate or merchandise in quantities.

7. *Conditions of trade or sale:* The condition of binoculars, cameras, instruments, other equipment useful to outdoor lovers, home-owners, etc., advertised for sale or trade must be specified as follows: PERFECT—meaning factory condition; EXCELLENT—meaning new condition, implying negligible amount of use; VERY GOOD—meaning practically new condition, implying little use, with no appreciable wear and only minor surface scratches or wear; GOOD—meaning moderate condition and with only moderate wear; FAIR—meaning no parts missing necessary to use, reasonable wear inside and out; POOR—meaning marred appearance or badly worn.

8. *Non-specific phrases barred:* Phrases such as "highest" or "top prices paid", as well as any other so-called "auction-type" phrases are not acceptable. The terms "fair price paid" or "state price wanted" may be used.

9. *Blind ads not acceptable:* Box number or blind ads will not be accepted. Give your complete name and address to insure prompt delivery of all mail or telegraph replies.

10. *Requesting privilege of examination:* Purchasers desirous of examining merchandise before acceptance should request shipment by express C. O. D. with examination privilege. This procedure permits the purchaser to inspect the merchandise in local express office and authorizes the express company to return unsatisfactory merchandise at shipper's expense.

11. The association will not accept for publication in NATURE MAGAZINE, advertisements of firearms, ammunition, or patent medicines.

12. *Responsibility for illegible copy:* Type or print advertisement plainly as we cannot be responsible for errors due to illegible writing.

13. *Closing date:* The closing date of all advertisements is the 20th of the second month preceding month of issue.

ATHLETIC GOODS

BARBELLS, DUMBBELLS. Exercise equipment, courses. Free catalogues. Good Barbell Co., Dept. N, Reading, Penna.

BOATS

ROWBOAT new or old kept dry indefinitely. No paint, waterot, deterioration, waiting, inexpensive. Copyrighted instructions $1.00. CRSA, Box 8, Nanticoke, Penna.

BOOKS

ALASKA'S NEW MAP—size 33x45 inches. Shows towns, roads, trails, air fields, streams, lakes, mountains, national forests, parks, game refuges, etc., $1.00 postpaid. W. Joseph O'Connor, Sportsmen's Equipment, Baker, Oregon.

CATALOG, 40 pages. Books, National Geographic, other magazines. Send 10¢ (refundable) Jack Heller, P. O. Box 2507, Los Angeles 53, California.

BOOKFINDERS! (scarce, out-of-print, unusual books) Quickly supplied. Send wants. Clifton, Box 1377nm, Beverly Hills, Calif.

NATIONAL GEOGRAPHIC MAGAZINES 1888—1947, any issue. Free literature. Periodical Service, Box 327-N, Swarthmore, Pennsylvania.

BIBLE STUDIES, 70 lessons, 25¢ complete. Bulletin, Box 87-N, Cathedral Station, New York 25.

"The Pamphleteer Monthly," 25¢. A guide to free and inexpensive books. The William Frederick Press, 313 West 35th St., New York 1, N. Y.

SECURE your out of print and second hand books from The Audubon Book Service, 415 Lincoln Ave., Brooklyn 8, N. Y.

HARD-TO-FIND, and out-of-print books our specialty; All subjects. Send wants! Jaher Book Service, 620-N East 178th St., New York 57, N. Y.

BULBS

BULBS FROM HOLLAND. Catalog describing hundreds of varieties of Tulips and Daffodils free for the asking. J. Heemsherk, c/o P. van Deursen, SASSENHEIM—HOLLAND.

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BUTTERFLIES, BEETLES & Living Cocoons from India. Papiliondae, Pieridae, Nymphalidae, etc. Lycanidae, Sphingidae, etc. Beetles of Cetonidae, Lucanidae, etc. Living Cocoons of Atlas, Edwardsie, Selene, Mylitta, etc. For price list write to The Himalayan Butterfly Co., Shillong, INDIA.

CAMERAS

COBRA vs. MONGOOSE, amazing struggle for survival: 8mm $4.50; 16mm $7.50. Free descriptive catalog. Loja, Box 74-R, Station B, Brooklyn 16, New York.

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SKYSCOPE, the new 3½" reflector. Precision ¼ wave aluminized mirror. Sixty power Ramsden type eyepiece. Equatorially mounted on sturdy metal legs. Used by schools, universities. Price complete $19.75. Write for descriptive literature. The Skyscope Company, Inc., 475 Fifth Ave., New York 17, N. Y.

PRISM BINOCULARS—Finest U. S. Gov't optics. Huge 50mm COATED objectives. Less than half price; 7x50mm $79.50; 10x50mm $89.50; 12x50mm $92.50 plus tax, prepaid. Literature on request. DuMaurier Binocular Mfrs., Dept. 88, Elmira, New York.

TELESCOPES, BINOCULARS, Microscopes,—big bargain, catalog free. Brownscope Company, 24 West 45th St., New York.

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"L-R-T" supplies unlimited fishbait, exterminates roaches, no poison, no mess, Guaranteed. Only 50¢ postpaid. Roach Trap Co., 1932 North 11th St., Fort Smith, Arkansas.

WILL IT RAIN? Continue fair? A barometer will tell. Send for circular. Will the fish bite? A fisherman's barometer tells when they won't and when you may make a record catch. Tests show 94% accuracy. $7.00 F.O.B. Rasmussen & Reece, Amsterdam, N. Y.

GAMES

TRUE SECRET of Ventriloquism. First time published. Free booklet. Quakerbush, Big Flats, New York.

HOBBIES

EARTHWORM CULTURE. A fascinating hobby; profitable home industry. Write for valuable free bulletin-review on "Earthworms: Their Intensive Propagation and Use."—Thomas J. Barrett, Earthmaster Farms, Box D-488, Roscoe, California.

"HOW TO MAKE MONEY With Hobbies"—authentic, profitable, $1.00 copy. Adirondack Press, Potsdam 8, N. Y.

YOU CAN ENTERTAIN with chalk talks. Catalog 10¢. J. G. Balda, Cartoonist, Oshkosh, Wis.

BIG MONEY making Shellcraft Kits! Chatelaine Gardenia $1. Violet Spray $1. Cameo Brooch, Earrings, $1. Big Beginners kit $3.50. Instruction booklet 35¢. Free Price List. Shelart, 3027 6th St., South, St. Petersburg, Florida.

FREE Franklin D. Roosevelt Memorial set complete. Other choice premiums. Catalogue 10¢. Post Card Exchange, Box 116K, Boston 17, Mass.

HOME STUDY

LINGUAPHONE FOR LANGUAGES. At home learn to speak Spanish, French, Russian, German or any of 29 languages by quick, easy Linguaphone Conversational Method. Linguaphone is available under GI Bill of Rights. Send for FREE book. Linguaphone Institute, 73 RCA Bldg., New York 20, N. Y.

INDIAN CURIOS

4 FINE ANCIENT Indian Arrowheads $1.00. Stone Tomahawk, $1.00. Flint Knife, 50¢. Spearhead, 50¢. List free. Lear's, Box 569, Galveston, Texas.

MAKE-IT-YOURSELF

WHITTLER'S—Supplies—blanks—special woods—knives. "Old" Whittler, 1402 Charles St., La Crosse, Wis.

MICROSCOPES

RARE BARGAINS! Zeiss, Bausch & Lomb, etc. Fully guaranteed! Many hundreds finest cameras, movie equipment, photo supplies, binoculars, Trade-ins! Brenner Photo Co., 933 Penna. Ave., N.W., Washington 4, D. C.

MINERALS

"ROMANCE IN STONES." Arizona rare minerals. Collectors or museum grade, 12 miniatures, assorted, colorful, brilliant, genuinely rare, $3. Sam Parker, 2160 East Van Buren, Phoenix, Arizona.

"GENUINE" deep red Arizona Rubies (Garnets). Send quarter for packet. Mineral Specimens Company, Box 2651, Phoenix, Arizona.

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PATENT MODELS—Special devices, expertly built. Reasonable. Nelson Manufacturing, 984 First St., Woodburn, Oregon.

POWERFUL MENTAL TELEPATHY, Practical. Free Literature. Elgin Johnson, 912 Benton, Nashville, Tenn.

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PIANO PRACTICING ANNOYING others? Mayo's muting device easily attached or detached by anyone without harming mechanism. State Upright, Grand, Spinet. Send $5.00 for Mute. Full instructions. (Guaranteed) Richard Mayo, Piano Technician, 1120 Latona Street, Phiiadelphia 47, Pa.

CAMERA TRAILS

(Continued from page 385)

and then there were so many models to choose from that selecting them constituted the greatest problem.

Thus, mellowed by time and with the discomforts far outweighed by the photographic opportunities, our trip to Fort Jefferson and the Dry Tortugas remains one of the high points in our photographic memories. The islands were truly a happy hunting ground for us.

We wonder whether readers of "Camera Trails" also treasure memories of some outstanding photographic jaunt—whether the subjects were birds, mammals, insects, flowers, mountains, or attractive sections of scenery. If so, we would like to hear about them.

CAMERA DATA

And now for a quick resumé of the trade notices and data that have come in since last we noted them.

For those who must do their purchasing by mail, the Penn Camera Exchange, 126 West 32nd Street, New York City, has inaugurated something new—an unconditional one-year service guarantee on cameras and other photographic equipment, purchased either in person or by mail. The guarantee covers both new and used equipment.

In the camera line, the Winpro 35 is a new, fixed-focus, 35mm amateur camera in the low-priced field. For people who want snapshots, and who lack the patience to "twist or punch" the numerous dials and levers usually found on miniature cameras, the Winpro should fill the bill. But, of course, the operator must remember to allow for limitations of fixed focus. More information can be obtained from the makers, Webster Industries, Inc., P.O. Box 370, Rochester, N. Y. Mention "Camera Trails."

Other camera supplies to be noted include the Bausch & Lomb 2x2 slide projector, back on the market with a number of improvements including a new projection lens and a new slide carrier. Kalart now has a speed flash attachment for the Ansco Speedex, adding this to a long line of similar attachments for other sizes and makes of cameras. For the darkroom worker, Kodak has a new plastic funnel that can be adjusted to three different sizes.

In the film line, the Anken Film Company, Inc., has announced a new roll film for amateur use, available in all popular sizes. Because of its high green sensitivity, it should give good results in outdoor snapshots. Its speed lies in the 50 group outdoors, and drops to either 25 or 32 for use indoors under artificial lights.

Kodak has a new contact paper, Illustrators' Azo, a companion paper to Illustrators' Special.

And finally, along the information line, are the following new publications or guides, all of them issued by Eastman Kodak Company. There is the revised data book on "Infrared and Ultraviolet Photography," price 25 cents, and the new "Movie Kodaguide," price 20 cents, another one of those handy four-page exposure guides issued by Kodak. As for free pamphlets, Kodak has the following recent ones: "Exposure Indexes and How To Use Them"—helpful to photographers who use exposure meters—and "Storage of Microfilms, Sheet Films and Prints." These last two may be obtained direct from Eastman's sales service division, Rochester 4, N. Y. And, lest you forget, please mention "Camera Trails" when you write for your copies.

Correction

Because we placed too much confidence in the photographer's identification of the plant presented on page 254 of our May issue as "Arrowhead", we much apologize for a grave error. Although the plants and leaves are quite similar, the fruiting parts of the plant shown are of the Arrow-Arum, *Peltandra virginica.* Arrowhead, or *Sagittaria,* has quite different seeds.

Passenger Pigeon

At the same time that it dedicated a monument to the passenger pigeon—an event recorded in "Contents Noted" this month—the Wisconsin Society for Ornithology has also published a memorial booklet to the bird, entitling it "Silent Wings". The booklet, which is available for one dollar from Walter E. Scott, Mendota Beach Heights, Madison 5, Wisconsin, contains articles by Aldo Leopold, A. W. Schorger and Hartley H. T. Jackson on the sad story of the passenger pigeon. This is an extremely interesting document ornithologically and historically, as well as a warning in wildlife conservation.

Nature Book Society

Nada Kramar, specialist in natural history books, announces the formation of "The Naturalists' and Sportsman's Book Society", designed to save money for members interested in books on natural history and sport. There are no dues, and full information may be obtained from Miss Kramar at 1906 K. Street, N. W., Washington 6, D. C. Books will be selected by an editorial staff consisting of Roger Tory Peterson, Joseph Ewan and Dr. Doris M. Cochran.

Unafraid

Clifton, Illinois, is fortunate in having as a columnist on the local weekly, the *Clifton Advocate,* one who writes on Nature and Conservation, and is not afraid to say what he thinks. This writer is Neil Trimble, a Chicago high school teacher with Nature as a hobby. He says that he fears that he has often irritated local gunners and farmers, but finds that wildlife has more friends than many realize. Keep it up, Mr. Trimble.

Slidefilms

Our Earth is the title of a kit of five discussional slidefilms recently released by the Jam Handy Organization, 2821 East Grand Boulevard, Detroit 11, Michigan. The subjects are: How We Think Our Earth Came to Be; The World is Changing; How Rocks Are Formed; The Story of the Earth we find in the Rocks, and The Soil.

White Squirrels

Mrs. Ettie W. Cox lives in Marionville, Missouri, "the land," she says, "of the big red apple." She writes us to tell us that they not only have apples and peaches there, but white squirrels—lots of them. These are gray squirrels that have gradually been developing white genes to the point that what would appear to be a concentration of albinos is developing. Some of the squirrels are definite albinos, with pink eyes; others are almost complete albinos; others are partly white. A city ordinance protects all squirrels in the community from killing or capture, because Marionville authorities are alive to the fact that something interesting is developing there, and that the squirrels are an attraction. Visitors, Mrs. Cox reports, become greatly excited by the number of white squirrels, adding that "Marionville has about 1250 inhabitants, not counting the squirrels".

Seattle Audubon Guests

Members of the Seattle Audubon Society paid many visits during the past winter to two unusual visitors wintering in their hospitable climate. They were two European widgeons that dropped in during November and stayed through the winter. Another visitor was a European teal, found late in the winter among the members of a large flock of our own green-winged teal.

Another Smart Rabbit

Confirming the story told on our "Contents Noted" page in February about the rabbit that sought protection with a human being, Edith Winford of Dallas, Texas, reports an almost identical experience. She was studying birds in a wooded section when a rabbit burst from the underbrush, stopping at her feet. In pursuit was a large dog, which Mrs. Winford drove away with a stick. Whereat the rabbit bounded safely away.

PERSONAL

IL PAINTING from your favorite photo. Send hoto for pencil sketch and estimate. F. Longillow, Lambert Lake, Maine.

PETS

EGULAR SHIPMENTS of rare tropical Birds, nimals and Reptiles received from all points in entral and South America. We ship anywhere in he WORLD. Write for Price List. Bowers Natral History Supply Co., (West coast office) 512 anta Monica Blvd., Santa Monica, Calif. (East oast office) Pinellas Master Airport, St. Petersurg, Florida.

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VERY PICTURE AN ENLARGEMENT. Bigger and Better snapshots than you have ever seen efore! New Electronic developments give you nproved lifetime deckled-edge *enlargements* at ur same low prices. Any 8 exposure roll developed nd printed ENLARGE size 25¢; reprints ¢ each. Fast, Accurate service guaranteed! Send or free mailers, today! Enlarge Photo Service, ox 791M, Boston, Mass.

LARGA-PIC means larger pictures! All your hotos come to you in brilliant LARGA-PIC size! 0¢ for 8 pictures and roll developed Free. Reprints 4¢ each. Write for Free mailers. LARGA-PIC, Box Z10, Brookline 46, Mass.

USTOM PHOTO FINISHING—Fine quality ork. Write for service list. Color Craft Studio, anbury, Iowa.

PLANTS

VILD FLOWERS and FERNS to brighten a hady nook. Free Booklet. Wake Robin Farm, R. D., Home, Pennsylvania.

BULL FROG life size 6" pre-war price, $1.25. Green, $1.50. Exp. Col. Concrete. Sanflex Studio, Box A, Clyde, Ohio.

NATIVE Flowering plants. 2 Orchids—2 Ferns —20 mixed Trillium $1.50. Free Catalogue. Three Laurels, Marshall, N. C.

POSTERS

WORLD WAR I Posters. Wish to dispose of fine arge collection, U. S. and foreign. Tod New, 226 6th St., Denver, Colorado.

POULTRY & SUPPLIES

RAISE FRYERS new scientific way. $6000 yearly ossible in your backyard. Booklet FREE. Poultry Guild, 1046-K So. Olive, Los Angeles 15, California.

PRINTING

PRINTING MACHINERY, Type, Supplies. Lists 3¢. Turnbaugh Service, Loysville, Penna.

SEA SHELLS

FOSSILS FOR SALE. Cabinet specimens 25 species $3.00. Lists. Carrie B. Williams, Clarksville, Ohio.

SHELLS FOR SALE. Land and Marine; Cape Cod. Special 12 for $1.00 in box; Lists on request. Mrs. F. K. Hadley, Box 33, West Newton, Mass.

SMALL ANIMALS

RAISE DIAMOND SEAL rabbits. We pay $30.00 -$60.00 each. Free details. Hansens Rabbit Institute, 1347 Miller Ave., Salt Lake City 6, Utah.

STAMPS FOR SALE

1,000 GRABBAGS, 15¢ each. Special Bags 25¢. Andy, 630 Bingaman, Reading, Pennsylvania.

STAMP COLLECTING

FINE APPROVALS, freshly mounted. Fast, personal service. Tell me what countries you prefer and I'll send their stamps. Philo Skinner, 438 Locust Ave., Long Beach 12, California.

SPORTING GOODS

3000 BARGAINS, war relics, binoculars, catalog 40¢. John's Gunshop, Runnemede, New Jersey.

Send 25¢ for list 100 used Guns, Frayseth's, Willmar, Minn.

Reptiles and Amphibians

Reptiles and Amphibians of the Northeastern States. By Roger Conant. Philadelphia. 1947. Zoological Society of Philadelphia. 40 pages. Illustrated. $1.00.

This is a non-technical resume of the snakes, lizards, turtles, frogs, toads and salamanders of the northeastern states, and it is presented with excellent illustrations of each species discussed. Twenty-seven snakes, six lizards, sixteen turtles, twenty toads and frogs, and eighteen salamanders are given concise descriptive and life history attention. Supplementing this material are popular discussions by Dr. Conant on herpetology, the importance of snakes, the general habits of lizards, spring calls of toads and frogs, caring for captive specimens, and other related material. Excellently printed in large size—a little larger, over all, than this magazine—this is a fine, useful and attractive booklet on the reptiles and amphibians of the region covered.—R. W. W.

Quail Decline

Southern Outdoors, published weekly in Atlanta, Georgia, pulls no punches in its report on game conditions. In its issue of March 1, 1947, it reports that the quail season in the South was the "saddest chapter in the history of upland gunning." More than 95 percent of the gunners questioned reported the poorest quail hunting they have ever witnessed, and most gunners were convinced that quail hunting was at the crossroads.

TAXIDERMY

GLASS EYES. Made in OUR factory. All kinds of Taxidermists' supplies. Complete catalog FREE. J. W. Elwood Co., 223 Elwood Bldg., Omaha, Nebraska.

WILD FLOWERS

WILDFLOWER catalog on request. Also lists ferns, shrubs, lilies. Orchid Gardens, Grand Rapids, Minnesota.

WOODWORKING

$46 from square foot of Plywood. Jigsaw necessary. Excellent home business. Write, Woodarts, X-90, Bridgewater, Mass.

WRITING

SELL IN THREE MONTHS OR MONEY BACK If you can write correct English—You can write Juveniles. I have sold some 3000-3500 stories . . . articles . . . editorials . . . serials . . . series. Now I'm teaching. "Instruction—Criticism—Collaboration." Write Dept. N for terms. Will Herman. Author of "My Juvenile Success Secrets" and "My Formula for Fiction." 5703 Broadway—Suite No. 4, Cleveland, O.

I WANT New Writers to cash hundreds of checks for $1 to $100, offered each month. The easiest way to write for pay. No previous experience necessary. Send for free details. No obligation. Saunders M. Cummings, 467-N1 Independence Building, Colorado Springs, Colo.

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TRY DR. BARRON'S NEW FOOT CUSHION Do you suffer from metatarsal callouses, corns, weak arch foot pains? Try **Dr. Barron's New Foot Cushions. LIKE WALKING ON A PILLOW!** Soft, **Spongy, Air-ventilated.** Fits all shoes. Cushions your **arches and feet from heel to toes.** Dr. Barron says: "Wonderful for tired, aching feet!" Send only $1.98 for A PAIR, or C.O.D. plus postage. State shoe size and if man or woman. 30-DAY TRIAL GUARANTEE. Money back if no blessed relief. ORTHO, INC., 111 W. 83 St. Dept. 97J, N.Y.C. 24

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Dozens of brilliant flaming colors in this Rainbow Mix Assortment . . . Darwin, Triumph, Breeder and Cottage Tulips for remarkable low cost of less than 2c per bulb. These are our prize selection of famous young especially selected strain and smaller because they are first and second year bulbs . . . 1½" to 2¼" in circumference. Satisfaction guaranteed or money back.

100 BULBS* $1.69

12 Dutch Iris Bulbs Extra

SEND NO MONEY! Order now, pay later. Bulbs reach you for fall planting for only $1.69 plus C.O.D. postage. Cash orders prepaid. Prompt action brings 12 genuine first year Dutch Iris Bulbs, gorgeous new purples and blues, without extra cost. Send order to

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Join the Bulb of the Month Club. You too can enjoy continuous bloom in your living room, throughout the year. Enclose one dollar with your name and address. You will receive by return mail, postpaid, this month's carton of rare flower bulbs—guaranteed to grow in your home or office. No dues or obligations, your dollar covers all membership privileges. Send your dollar today, to—

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Tells How You Can Learn to MOUNT BIRDS!

Learn At Home

Men, Boys, Hunters, Fishermen, **mount** and **save** your lovely wild-game **trophies.** Be a **Taxidermist.** Mount **Birds, Animals, Heads, Fish, Tan** skins. **YOU** learn easily, quickly in **spare time.** Have a grand **home-museum.** The finest and the greatest **hobby known,** for sportsmen. **Fun, real profits.**

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Yes. **FREE.** Beautiful **strange,** valuable **Book,** telling **all** about Taxidermy. Contains over **100** beautiful game-pictures. And it's yours **FREE,** if you rush your request. You can mount **all kinds of wild-game,** and common specimens too. We can positively **TEACH YOU.** So **GRASP** this opportunity. **RUSH** letter or postal for this amazing **FREE BOOK.** Don't delay. State your **AGE.**

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STOP APHIDS!

And certain other sucking insects which damage foliage, fruit and flowers.

BLACK LEAF 40

gives these pests a "double-barrel treatment"— It kills by contact; also by fumes which penetrate the densest foliage. "A Little Goes A Long Way" — One ounce of Black Leaf 40 makes 6 gallons of effective aphid-spray.

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LOOK FOR THE LEAF ON THE PACKAGE

Under the Microscope

By JULIAN D. CORRINGTON

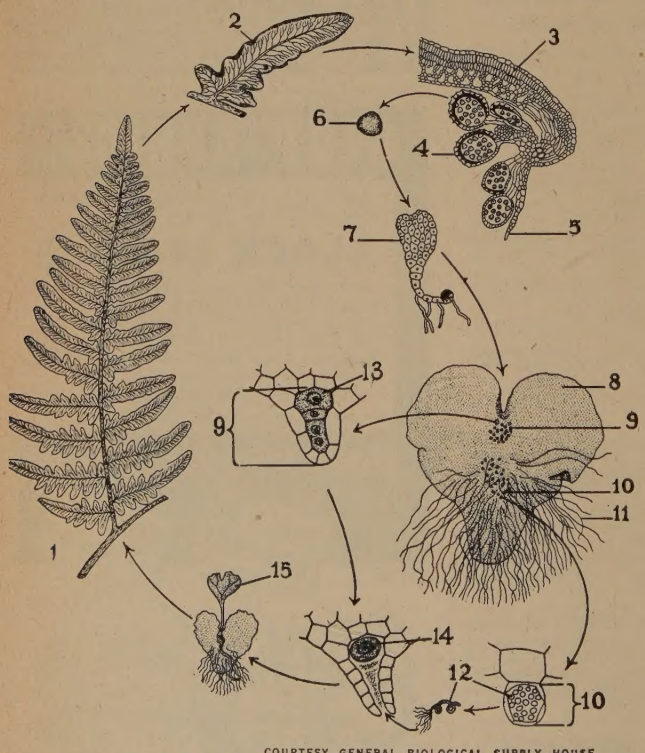
FERNS

I. Introduction

NOT since our account of Wheat Rust, in the May, 1943, issue, have we dealt with the fascinating subject of plant life cycles. We use the word "fascinating" advisedly; you do not have to be a botanist, or even a scientist, to appreciate the marvelous machinery and intricate sequences of events displayed by plants in their reproductive cycles as they march down through the ages. There is abundant food in this topic for observation, gross and microscopic; for experimentation; and for speculation by the philosopher as to the significance of such facts in our universe.

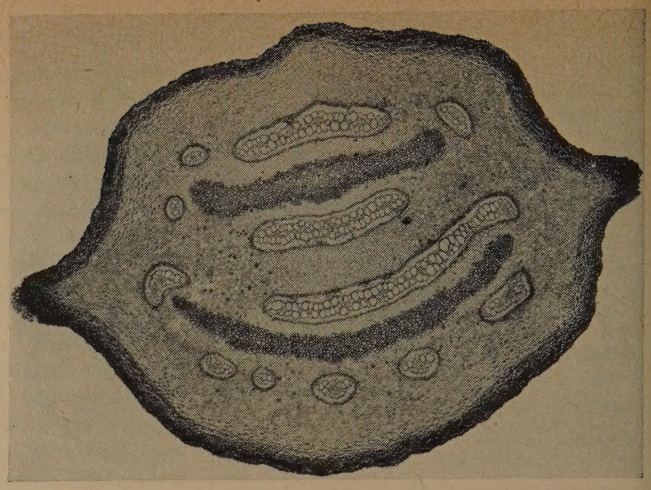
The clearest and hence the best such life cycle with which to begin is that of ferns, organisms that stand somewhere near the middle of the grand panorama of plant evolution. While details differ according to the type of fern, the following general account will bring out the essential features, as the introductory one of a series of three articles. In the two following issues, a number of interesting slide preparations will be described, both whole mounts and sections.

One may start traveling around a circle from any point, but custom dictates the wise course of beginning, in this case, with the familiar leafy fern plant. Everyone knows ferns, but only the botanist or student of general biology is aware that they lead a double life. There are two kinds of plants in the career of each species, and these are so utterly unlike that for



COURTESY GENERAL BIOLOGICAL SUPPLY HOUSE

Fern life history. (1) Portion of leaf, sporophyte generation. (2) Marginal sori with sporangia. (3) Palisade layer. (4) Sporangium. (5) Indusium. (6) Spore. (7) Young gametophyte, produced by germinating spore. (8) Gametophyte. (9) Archegonia. (10) Antheridia. (11) Rhizoids. (12) Sperm. (13) Egg. (14) Zygote. (15) Young sporophyte produced by germinating zygote.



***Pteris* rhizome in cross section, 15 X**

a long time, in the history of plant science, the two forms were thought to be distinct organisms, in separate divisions of the classification scheme. Since both of these plants are technically ferns, there is need for some further refinement as to names; the well-known fern plant is called the *sporophyte,* the other one the *gametophyte,* for reasons shortly to appear. Being stages in a complete cycle, neither of these can reproduce its own type, but only the opposite form.

The mature sporophyte presents some additional facts that come as a surprise to the beginner in fern study, but even he can readily see, by making comparisons with other kinds of plants, the actuality of the following description. The stalks that we observe growing above ground are not stems with leaves upon them; they are compound leaves. The stem itself is, in most cases, horizontal and underground, a growth form known botanically as a *rootstock* or *rhizome.* From this buried stem true roots run downward through the soil, and leaves rise vertically above. At first each leaf is tightly coiled, but in its growth it unrolls from base to tip, like the chin-tickler toy one blows into to uncoil, beloved of New Year's celebrants. When fully unrolled, each leaf consists of a leaf-stalk or *petiole,* sometimes incorrectly referred to as a stipe. The *blade* or part corresponding to the entire flat leaf blade of such a tree as a magnolia or maple, is cut up into a large number of *leaflets,* thus making the whole structure a *compound leaf.* These leaflets are green, and manufacture sugar by means of chlorophyl, as do the green parts of other plants. In some species the leaflets, especially the basal ones, are again subdivided, making the leaf doubly compound.

The fern sporophyte is a *vascular plant,* by which is meant that there is a true transportation system of vessels, from root through stem to leaf. Those ducts that take water upward constitute the xylem, those that carry food downward the phloëm, as previously described in our articles on roots (April, 1945), the monocot stem (March, 1946), and dicot stem (May, 1946). In the accompanying photomicrograph of *Pteris* rhizome in cross section, the outer layers and the two long strands of dark-colored material running through the interior are classed as mechanical tissue, the light background is parenchyma, while the twelve areas, large or small, with many large perforations, are the vascular bundles. In a single bundle, the large holes make up the xylem, outside of which lies the less conspicuous phloëm.

All three of the basic parts of higher plants are present—root, stem, and leaf. Ferns, of course, do not have flowers and fruits, in the usual sense; they belong to a lower group of flowerless plants, the Phylum or Division Pteridophyta, numbering some 10,000 species of ferns (9000), horsetails, and club-mosses, former types of which reached gigantic size in past ages.

When fully mature, the fern sporophyte gives off *spores,*

single cells that can alone reproduce an entire organism. The process does not involve sex at all and is classed as asexual. When such a spore germinates, it does not produce a leafy fern plant, but instead a small green object, the gametophyte, strongly reminiscent of the lowly algae. It is called a *prothallium* or prothallus, and is flat and heart-shaped, with neither root, stem, nor leaf. The plant body is thalloid, that is, composed of plates or filaments of similar, rather undifferentiated cells, without separate tissues. The gametophyte puts out *rhizoids* (root-like), which are colorless filaments devoid of any of the structure of true roots, yet serving the root functions of anchorage and of absorption of water and minerals from the soil. This prothallus is a frail and unprotected affair that can only flourish in moist and shady situations.

When mature, in its turn, the prothallium develops sex organs. These are *antheridia*, hollow spheres located among the rhizoids at the base or point of the heart-shape, and *archegonia*, conical flasks, growing in the notch at the other end of the heart—the *apical notch*. Each antheridium produces numbers of flagellated sperm cells, and each archegonium a single egg. Rhizoids, antheridia, and archegonia lie on the bottom surface of the thallus, next to the soil, and fertilization is essentially an aquatic occurrence, as in algae. The sperm must swim to the egg in not less than a surface film of water. Egg and sperm are *gametes*, cells that differ from spores in that union of two of them is required for reproduction, the process being termed sexual.

The fertilized egg does not develop into a plant like its parent, but on the contrary, like its grandparent. From the archegonium, containing a fertilized egg, there grows out an embryo sporophyte, which remains fastened to gametophyte tissues by a mass of cells termed the *foot*, and lives on its parent parasitically for a short time. Soon, however, this young sporophyte develops its own root, stem, and leaf and, when these are far enough along to maintain life independently, the old gametophyte withers and dies.

Thus the sporophyte, or spore-bearing plant, reproducing asexually, alternates with the gametophyte, or gamete-bearing plant, which reproduces sexually. This phenomenon, universal in higher plants, and exhibited by jellyfish and tapeworms among animals, is metageness or *alternation of generations*. In mosses, the gametophyte is the conspicuous, green, leafy plant, the sporophyte being dependent; in ferns, the sporophyte is the dominant generation, a trend that continues into the flowering plants, where all of the visible organisms we know are sporophytes, and the gametophyte is so reduced and degenerate as actually to be microscopic and concealed within the tissues of the sporophyte.

TRADE NOTES

Biology Older students of the subject will recall a well-known earlier text, Plunkett's *Elements of Modern Biology*, which had a long and successful career. Dr. Douglas Marsland, of New York University, has completely reconstructed and modernized this work, under the title *Principles of Modern Biology*, and has thereby produced one of the best and most readable books on general biology we have seen. He has retained the original theme of presenting biology as "a consistent integrated body of knowledge and theory aiming not merely to describe but to explain the phenomena with which it deals." Morphology has been fortified, human biology has been stressed more than heretofore; the fundamentals of nutrition, response, and reproduction have not only been introduced at the outset, in work on the cell, but again under higher plants, and still again under higher animals, a device to reinforce the learning process of these essentials. "Abstract biological principles, regardless of how clearly they are stated, fail to engage a student's active interest unless they are related to common experience, or to experiments and observations which are fully and clearly explained. This precept required not only a very complete rewriting of the text, but also the addition of many new illustrations which fully exemplify every discussion." So writes the author in his preface, and he proceeds to do just that, with success.

This volume is a true biology and not merely a compilation of botany and zoology. We especially liked the thoroughgoing treatment of chemistry and physics as applied to living matter; no punches are pulled, nor are these topics glossed over with half-truths. The book is quite up-to-date, and is recommended for the general reader as well as for classroom use; teachers should inspect this book if they are considering a new adoption. Pp. ix, 774; figs. 350, tables 23, glossary. Henry Holt & Co., 257 Fourth Ave., New York 10, 1945. $3.90.

Zoology *Animal Biology*, third edition, by the late Robert H. Wolcott, has been revised by the Staff of the Department of Zoology, University of Nebraska, as a memorial to a former friend and colleague. Extensive additions and changes have been incorporated without disturbing the basic plan of the work, which is a successful combination of the types and principles approached.

Part I considers such fundamental principles as matter and energy protoplasm, life, metabolism, and cells, Part II discusses the protozoa, Part III includes

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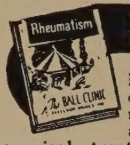

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principles that apply to multicellular animals, as mitosis, tissues, organization, reproduction and development, form and classification; Part IV, the bulk of the book, surveys the metazoan phyla, emphasizing the vertebrates and man, and Part V takes up further generalities, as energy changes, disease, behavior, ecology, distribution, paleontology, evolution, heredity, taxonomy, and history. There is an excellent glossary and list of available motion picture films. The treatment of each topic is necessarily brief and to the point, the whole containing an immense amount of closely packed information. This makes the book distinctly a text, for study, not for leisure reading, and prevents the exposition of any literary style other than the purely descriptive. But the plan is excellent and has high pedagogic and reference value, the context is clear and accurate, the illustrations copious and satisfactory. Highly recommended as a college text and as a reference manual for the general reader. Pp. xviii, 719; figs. 508. McGraw-Hill Book Co., Inc., 330 W. 42d St., New York 18, 1946. $4.00.

Medicine Dr. Henry E. Sigerist, Director of the Institute of the History of Medicine at Johns Hopkins, provides some novel concepts in *Civilization and Disease,* based on his Messenger Lectures at Cornell University. Much has been written, both erudite and popular, on the history of medicine, but this book has an entirely different approach, being neither history nor medicine *per se,* but taking as its central theme the many ways in which disease has molded civilization. There are separate chapters on disease and economics, social life, law, history, religion, philosophy, science, literature, art, and music. Civilization is also shown as a factor in the genesis of disease, under the headings of food, clothing, housing, occupation, and social relations.

Dr. Sigerist gives many interesting details, as in the accounts of the treatment of lepers through the ages, or that curious epidemic of tarantism, the dancing affliction, for which the sole cure was music. Yet the book is no mere string of anecdote; the author succeeds in keeping the broader picture of the whole sweep of civilization and of its major movements always to the fore. The fine photographic illustrations are well selected. This original and important story is certain to appeal to a wide diversity of readers. Pp. xii, 255; figs. 52. Cornell U. Press, 124 Roberts Pl., Ithaca, N. Y., 1945. $3.75.

Ornithology Comprehensive, accurate and beautiful are the words for the revised edition of *A Laboratory and Field Manual of Ornithology,* by Olin Sewall Pettingill, Jr., of Carleton College. There are very few works that could serve as a text book for the subject and this manual makes one unnecessary, supplying ample reading and reference material in addition to a very thorough series of laboratory exercises and field studies, as the following chapter headings indicate: topography of the bird, feathers and feather tracts, internal anatomy, classification and nomenclature, external structural characters, laboratory identification, plumages and coloration, distribution and migration, field identification, bird ecology, bird communities, bird territory, mating, nests and nest-building, eggs, egg-laying, and incubation, young and their development, parental care, and bird populations. The seven appendices deal with field methods, such as the use of observation blinds, preparation of a paper, and variously classified bibliographies.

The illustrations, mostly by Walter J. Breckenridge, are especially fine and interest-compelling. For the student, this is a workbook he will long treasure; there are drawings to make or to label, reports and charts to fill in, outline maps for migration data, identification and field report tables, and numerous other activities to record. The book is exceptionally well organized, written, and printed; it is laboratory notebook size, and has stiff paper covers and spiral wire binding. Pp. v, 248, many illustrations. Burgess Pub. Co., 426 S. Sixth St., Minneapolis 15, 1946. $3.50.

Genetics In the year of Our Lord, 1957, television commentators are going to remark on the oddity of our ignorance, in 1947, of the science of genetics. By that time doctors, lawyers, nurses, public officials, social workers, and the like will know all about the physiology and heredity of amaurotic idiocy, Huntington's chorea, left-handedness, and the Rh blood factor, as a matter of routine. Today, these vital concerns are understood by only a handful of specialists. The general reader, then, as well as the student of biology, will be much interested in a splendid new account of what is known at the present time of the inheritance of defects in man.

Genetics, Medicine, and Man, is a brief volume by three prominent authorities, comprising the six Messenger Lectures at Cornell University for 1945. Professor H. J. Muller, Nobel Prize Winner for 1946 in Medicine and Physiology, discusses in non-technical language the mechanism of heredity, the nature of genes and how they operate and become altered, how heredity works for populations as well as for individuals, and the significance of sexual reproduction and genetic changes in the evolution of species. Dr. C. C. Little sums up a wealth of experimental evidence, chiefly on mice, of all of the ways in which parents may influence offspring at any stage of life, of the factors influencing growth, and those that determine individuality. He points out future problems, showing how genetic research is destined to become highly important in medical, psychological and sociological fields. Professor Laurence H. Snyder applies the subject to man, explaining what is known as to inheritance in man and how such knowledge is made possible, the role of genetics in medicine, how mutations operate in our species, and their implications for the race as well as for the family or individual. Pp. xii, 158; figs. 29. Cornell U. Press, 124 Roberts Pl., Ithaca, N. Y., 1947. $2.25.

TECHNIQUE HINTS FROM CAROLINA TIPS

One of the larger biological supply houses in the United States is the Carolina Biological Supply Company, of Elon College, N. C. Their trade journal, *Carolina Tips,* is published monthly and frequently contains short articles of interest to the microscopist. In the March, 1947, issue (Vol. X, No. 3) appear three items of such practical interest that we have secured permission to replace them. We extend our thanks to the writers and to the firm for this privilege, and reproduce the first of these entitled, Repairing Damaged Microscope Slides:

Microscope slides frequently are damaged; the slides or cover slips may be broken; bubbles may appear in the mounting agent; or the objects may move to the edge of the cover slip.

Air bubbles may be removed from balsam mounts by gently heating the mount. Should the bubbles be large, it is sometimes necessary to add a drop of thin balsam. A slight amount of pressure applied to the cover slip may aid in removing the bubble.

A broken cover slip may be replaced on a balsam mount by gently heating the cover slip, removing it with forceps, and adding a new one. This technique is unsatisfactory for delicate mounts or for those mounted in a small amount of balsam. Cover slips may be removed from these by soaking over night, if necessary, in creosote-xylene.

We have found no method for reclaiming broken slides of smears or paraffin sections, but whole mounts and celloidin sections may be removed from the slides for remounting by soaking in creosote-xylene.

Objects that have floated away from the center of a balsam mount may be re-centered by heating and adjusting the position of the object by running a fine wire underneath the cover slip.

Mounts made with media that harden rather than soften on heating are more difficult to repair. We have had some success in removing coverslips from these by inserting a needle under the edge of the cover slip and breaking it away from the slide. Fresh mounting medium and a new cover slip may then be added.